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The Farmer's Digest

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The Farmers Digest

Volume 18 August-September 1954 Number 3

THE MOST SUCCESSFUL FARMERS DON'T FOLLOW "THE SEASON"

An article of vital interest to all farmers. . .

Condensed from Michigan Farmer

Gilbert Gusler

SHALL I raise February or April pigs? Shall I sell my steers now or hold another 60 days? What's the best time to start chicks for the laying flock? When shall I sell that crop that's in the bin? Shall I plan to store this year or sell at harvest?

Answers to such questions depend partly on the "seasonal variations" in prices of farm products . . . on the tendency of prices for each product to fluctuate in a certain way with the time of year.

These price patterns grow out of the fact that farm production and marketing are highly seasonal. Supplies of each product are more plentiful at some seasons than at others. Consumption is much more uniform, although it also may vary to some extent with the season.

Seasonal price changes have certain jobs to do. Low prices in the season of abundance give an incentive to producers and to tradesmen to store and distribute the market supply more uniformly through the year. They encourage greater consumption at that time also. High prices in the season of low supplies reward those who bore the

Reprinted by permission from Michigan Farmer, Detroit, Michigan

cost of storing in the time of plenty, or the extra cost of those who produced "out of season." High prices also hold down consumption in line with the smaller supply.

The accompanying charts show seasonal variations for most of the leading farm products. You will note that the variations for some products are quite pronounced. Hogs, milk, eggs, corn, soybeans, potatoes and apples are examples. At the other extreme are good and commercial cattle, calves, wool, wheat, rye, hay and flaxseed which have rather narrow seasonal fluctuations. In general, products that are readily stored have smaller seasonal swings than perishable products.

Seasonal Variations Based on Average Prices Received

Most of the seasonal variations shown on the accompanying chart are based on U. S. average prices received by farmers. They include all classes and grades of the product. Part of the rise in corn prices from fall to summer is a result of the improvement in grade as the moisture content declines.

Farm prices for turkeys are low in late spring and summer partly because most of those coming to market at that time are discarded breeders. Prices are high in November-January because farmers are then selling highly desirable young hens and toms.

The seasonal variations shown in prices for lambs is caused partly by changes in the kind of lambs farmers sell at different times of the year.

The seasonal variations shown for hog prices include light and heavy weights and old sows as well as barrows and gilts. If separate farm prices were available, barrows and gilts would be found to have slightly different seasonal variations from sows and light hogs from heavy hogs.

Furthermore, the seasonal variations based on national average prices would not necessarily apply to every state or market. The seasonal declines in crop prices as harvest approaches, for example, would start earlier in southern states and markets than in the north. Winter wheat prices will start to decline before spring wheat. Grass cattle are likely to turn downward in southwestern and California markets earlier than at midwestern markets.

Computing indexes of seasonal variation is not a simple task. You can't take monthly prices for a product for a series of years, get the average for all the Januarys, then all the Februarys, and so on through the year and call the result the seasonal variation in prices of that product. Such a method will give some idea of the seasonal, but

other important influences also were tugging at prices and causing them to change.

For example, the general price level may have been rising or falling and causing a similar trend in prices for the product. Or, prices for the product may have had an independent upwar or downward trend because of a rising or falling cost of production. Or, prices may have had cyclical swings, as cattle and hog prices do, and the price series used may not cover equally each of the phases of the cycle. Then, such unusual conditions as outbreak of war, business depression, drought, price ceilings or price supports may have affected prices for part of the period unequally. A storm or strike may have thrown prices in a single month far out of line.

In calculating seasonals, steps are taken to remove the effect of such influences so far as possible in order to isolate the price variations due to the time of year.

Seasonal variations for some products have changed in the course of time because of changes in the production and marketing pattern. Eggs are the outstanding example. Earlier hatching than in former years has moved forward the time when the low point in production and high point in prices occurs from December to September or October and has greatly reduced the price variation from the spring low to the fall high. Similar changes but in less degree have taken place in some other farm products, notably hogs. For many products, however, the seasonal price pattern has shown little change over a long period.

If you chart monthly prices of a commodity for each year for a series of years you are likely to find that in no year have prices followed closely the seasonal movement which is an average of all the years. However, if you compare the individual years with each other, you may discover that they fall into certain types.

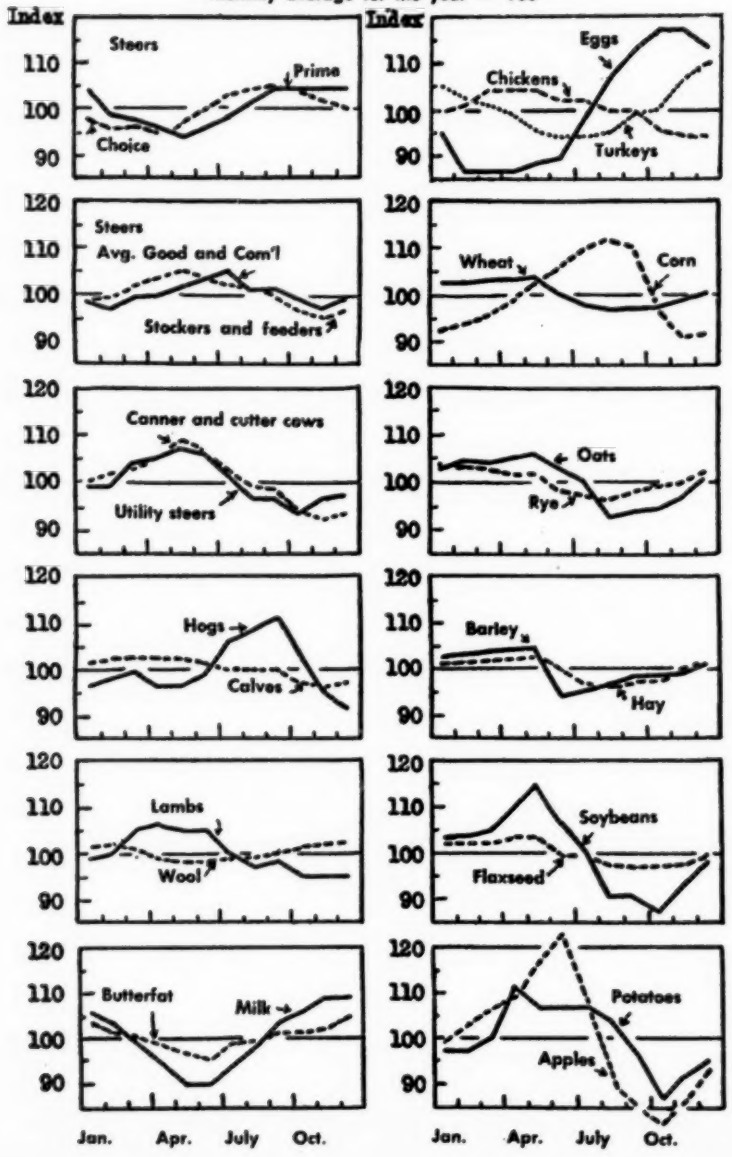
If you group the years according to these types of seasonal price movement, the chances are that all the years in any group were dominated by certain supply or demand factors. Or, putting it the other way around, if you take years in which certain important supply or demand conditions were present, you are likely to find a good deal of similarity in the way prices behaved during those seasons.

Seasonal Variations Expected Under Certain Conditions

This approach leads to the development of what are sometimes called "conditioned seasonals," that is, the seasonal variations to be expected when certain conditions prevail. These can be seasonals for the entire

SEASONAL VARIATIONS IN PRICES OF FARM PRODUCTS

Monthly average for the year = 100



calendar or crop year or may cover only a short period of the year.

These "conditioned seasonals" are more useful in predicting what prices are likely to do than a seasonal which is an average of several years in which a variety of conditions prevailed.

Take potatoes as an example. The accompanying chart shows that seasonal influences, on the average, have lead to an advance of over 25 per cent from October to April. However, if the years are grouped according to size of crop, it will be found that the advance is quite large in seasons of light crops and small or completely lacking in years of big crops.

Hogs provide a more complicated example. Studies have shown that there are 4 rather characteristic types of seasonal variation:

(a) Years following harvest of a large corn crop when hog production is increasing. The hog prices curve is tipped sharply downward with the summer peak below the late winter peak.

(b) Years following a small corn crop when hog production is increasing. Hog prices are slanted down but less sharply than in (a) years.

(c) Years following a large corn crop when hog production was declining. Hog prices have an upward tilt with the summer prices much over the late winter level.

(d) Years after a small corn crop when hog production was declining. Hog prices rise more sharply from winter to spring and have a sharper summer peak than in (c) years.

Seasonal variations in cattle prices also are strongly influenced by the size of the corn crop. When a large crop is ripening, cattle on feed are held back in September for further fattening. Buyers are aggressive for feeder cattle. Prices for slaughter cattle are likely to rise more than usual in September and October. If a small crop is coming to harvest, cattle on feed are dumped and feeder cattle buyers are scarce, so that the early fall rise in fat cattle is small.

In late winter and spring after a big corn crop, supplies of fed cattle are heavy and the price drop from early fall is greater than usual. If the corn crop is small, the cattle price decline to spring is less than average, and the rise to the following late summer and fall is likely to be greater than average.

Wheat prices show greater strength in late winter and spring in years of a small carryover or small "free" stocks and prospect of a small new crop than when opposite conditions prevail.

Corn prices have had different seasonal patterns depending on whether the crop was large,

medium or small and on whether it was followed by a large, medium or small crop in the next year. When the crop was small, prices had already advanced in late summer and did not have as much seasonal rise from fall to spring as in large-crop years.

* * *

Careless application, poor atmospheric conditions at the time of painting and too much moisture are listed as the three main reasons why many paint jobs deteriorate too rapidly.

* * *

The majority of farmers generally sell in the low-price period of the year. That is likely to be the time when cost to produce or get to market is lowest. Because many producers take the easy way and because extra cost is involved, production and marketing patterns won't change enough to eliminate seasonal variation.

Extent of the seasonal variation for any product indicates the reward for "going against the crowd," for adjusting production and marketing in order to have the product ready for sale in the high-price season. Extra costs must be taken into account, of course.

For milk, butterfat, eggs, veal calves and some other products, there is little or no choice about time of marketing after they have been produced. They must go regardless of price. But study of seasonal variations will help to decide whether to have cows freshen in spring or fall and when to have pullets come into production.

Seasonal price variations suggest the probable best time to have pigs and lambs born, allowing for the usual period of growth and for any cost differences. They help to decide when to buy feeders or stockers. They provide a rough guide as to the price risk in holding cattle, hogs or lambs another month or 2 for greater weight gains. They help in developing a crop program to store heavily when prospects for a price rise are good and avoiding long storage when the chance of price grain is small. And they aid in deciding when to cash in the products you may have stored.

In making such decisions, the seasonal variations shown on the chart provide a starting point. But you should consider also influences which may cause supply or demand to change from normal and thus cause prices to depart from their usual behavior in the period with which you are concerned. In short, modify your expectation according to the conditions operating in that period.

Do this and you can be sure that in the long run, you will sell your farm produce at prices above the average for the year and much above the year's lows.

FROZEN SEMEN

A report on research work at Ohio State University. . .

Condensed from The Agricultural Student

Charles Grimes

RESEARCH work on the freezing of semen for artificial insemination was begun in England in the early part of 1952. Six months later work spread to several universities in the United States.

Ten to fifteen years previous to this, it was known that plant tissue and red blood cells could be frozen without any harm, but the work in freezing reproductive cells lagged.

Currently, several important experiments in dairy science being conducted at Ohio State are concerned with freezing techniques of bovine semen. One is designated to determine the best temperatures for holding frozen semen, another is concerned with the causes of "kill" during the freezing process.

Diluting and Freezing

Diluting semen for freezing is done much the same as diluting semen for immediate use except that the mixture contains seven and one half percent by volume. Freezing semen is a slow and delicate process requiring careful observation unless done by a mechanical machine. Ampules containing semen are placed in an alcohol or acetone bath for freezing. Dry ice is added to this liquid in varying amounts to reduce the temperature at the proper rates and to the desired degree.

The freezing is started at five degrees C. and lowered to minus 15 degrees C. in about 45 minutes. Temperature drop from minus 15 to minus 25 is rather rapid and requires about ten minutes. The temperature of the semen is next lowered to seventy-five degrees below zero in as short a period of time as possible, usually ten to 15 minutes. During this entire process the

Reprinted by permission from The Agricultural Student of Ohio State University Westerville, Ohio

person must keep a constant watch on the thermometer to avoid killing sperm.

When this work was first started, frozen semen was stored at minus seventy-five degrees in an insulated dry ice box. In the fall of 1953 a sub-zero box was installed which holds the frozen semen at one hundred degrees below freezing.

This box is mechanically operated and records variation in temperature on a time recorder. The six cubic foot box is cooled by the use of ethane and freon 22 which is compressed by two 2-horsepower motors. This box will help to determine any benefit to storage at a lower and more uniform temperature than that of dry ice.

It is important to realize that if sperm are not kept below minus sixty-five degrees centigrade they will die much sooner as compared to samples held at minus seventy-five. For this reason ampules are kept in the alcohol bath. The alcohol does not absorb heat as fast as the ampule. Therefore if the ampules are exposed they are not likely to reach a temperature higher than minus sixty-five degrees C. when kept in alcohol if exposed for a short period of time.

At present there are samples at the Ohio laboratory which have been frozen over a year and show no decrease in motility of of the semen from the time of freezing. England has found similar results over a period of two years.

Ohio has shown that conception rate is just as good or better than with natural semen. Several thousand cows in Ohio have been bred with frozen semen and about eight or ten inseminators are using frozen semen regularly.

Plans are now under way to establish frozen semen banks throughout Ohio. This would require the inseminator to get semen only every other day or possibly twice a week. The first bank will probably be set up in Ashtabula County and serve a six county area in northeastern Ohio.

Low-Cost Horn Fly Control—Beef cattle sprayed monthly during the horn fly season with a 0.5 per cent DDT solution will gain about 18 pounds more per animal than those not sprayed. Rubbing posts treated with insecticide solutions are not only just as effective as the monthly sprayings, but the cost of the insecticides is cut in half and there is practically no labor charge. The type of post used makes little difference but the location is all important. Best results come from placing the posts where the cattle spend most of their time.—*Louisiana State University*

Phenothiazine Pays Off in More Pounds

New low-level feeding of phenothiazine casts new slant on worm control. . .

Condensed from Western Livestock Journal

NEWEST slant on the control of worm parasites in cattle is the use of phenothiazine in low-level feeding throughout the year.

This drug has been used for some time as an annual dose treatment but its use in daily low-level feeding for cattle is a late development. Research along this line is uncovering the fact that many herds which presumably were doing well, have improved their rates of gain when regular dosages of phenothiazine were administered in the feed.

As A. C. Todd, veterinary scientist at the University of Wisconsin, points out, "Greatest injury from parasites to a host animal occurs in the interval after exposure and before the maturity of the infection. It is during this period that parasite infestations escape attention."

Two Important Actions. Phenothiazine fed at the rate of 1.5 to 2 grams per day carries out two important actions. It reduces the number of worm eggs put out by the female worms and, inhibits the development of eggs and larvae in the dung. This double action lessens the exposure of the cattle to reinfestation by reducing the number of infective larvae on the pastures. Also the build-up of severe cases of parasitism is prevented.

In recent experimental work, the U.S. Bureau of Animal Industry and other research groups have obtained pronounced rate-of-gain increases in steers, young heifers, weaned and unweaned calves by the use of phenothiazine fed at low-levels daily. In these tests the drug has been successfully administered in the following ways:

Phenothiazine-salt: A mixture containing one part phenothiazine and 10 parts salt—fed as a free-choice supplement.

Phenothiazine-mineral mix-

Reprinted by permission from Western Livestock Journal, Los Angeles, California

tures: (1) A mixture containing 1 part phenothiazine to 9 parts general mineral mixture by weight and fed as a free-choice supplement. (2) A 1:19 mixture has also been effective under certain conditions. (3) A mixture containing 3 parts limestone, 3 parts bonemeal, 3 parts salt and 1 part phenothiazine by weight.

Phenothiazine-cottonseed meal: A mixture containing two grams of phenothiazine per pound of cottonseed meal—either hand fed or given as a free-choice supplement by mixing with 20-33% salt.

Test Results. In a two-year test conducted in Ohio on Hereford steers having only mild infestations of parasites, the return in beef was 45 lb. for each pound of phenothiazine used, or $4.46 for each dollar spent on the drug. The phenothiazine was administered free-choice in a mixture of 1 part of the drug to 10 parts salt. During the first year the treated steers outgained the untreated by an average of 20.5 lbs. per head. During the second year, a second treated group outgained their controls by 15.3 lb. per head. Comparable results have been obtained with steers showing no noticeable signs of infestations and with heifers and calves in Texas, Oklahoma and Louisiana.

Among the advantages of this drug is its relative lack of toxicity to animals, The safety of phenothiazine, which is not stored in the animal tissues or fat, has been firmly established by experimental and field results over the past several years.

Research work shows that the greatest profits will be realized with a management program which includes both a maximum dose treatment and continuous prevention treatment. This means using the drug in two ways: (1) treatment using a maximum dose and (2) continuous administration of 1.5 to 2 grams per day throughout the year, particularly during the time the animals are on pasture or range.

Treatment Phase. For the treatment phase which is done routinely in spring and again in the fall following the pasture season, the recommended dose is 20 grams of phenothiazine (about two-thirds of an ounce) for each 100 lb. of body weight. The dose treatment can be administered as a drench, in a bolus or capsule or mixed with the feed.

Concluding a recent report on the use of phenothiazine and a summary of research work being carried out throughout the country, the DuPont Co. of Wilmington, Del., states, "Additional tests will no doubt be required to work out the details for the most efficient ways of getting cattle to take small amounts of phenothiazine daily under the various conditions

encountered in various types of cattle management. The early and recent work of the U.S. Bureau of Animal Industry and other research groups, however, has shown the way. It remains only for the manufacturers of cattle feeds and mineral supplements to work out, the practical details."

Cattle Can De-Louse Themselves

Cattle will de-louse themselves if given the opportunity, U. S. Department of Agriculture research shows. Provided with an insecticide-treated device that they could rub against, both beef and non-milking dairy cattle herds completely freed themselves of these biting and blood-sucking pests in less than four weeks.

Encouraged by these promising results obtained in 1953 experiments under feed lot conditions, USDA entomologists are now carrying forward tests with the "de-lousers" using several insecticides to find the most effective one for farm and ranch use. They believe that this method of de-lousing cattle may appeal to northern cattlemen who live where cold or damp winters make spraying or dipping the animals undesirable.

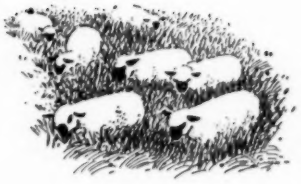
The de-louser developed by the entomologists consisted of burlap-wrapped wire that was stretched from the top of a five-foot post and anchored to the ground nine feet from the base of the post. The burlap was treated with about a gallon of insecticide.

Four herds of test cattle in Oregon, checked 15 days after the rubbing devices were made available to them, had reduced the number of live lice on their bodies by 90 per cent. No live lice were found on any of the animals in the nine herds under test after the 25th day; nor during the next 30 days during which observations were continued. Counts of lice populations prior to treatment showed all cattle to be infested, ranging from 1.8 lice per square inch to 5.6 lice per square inch. There was no decrease in louse population on check cattle not allowed to use the rubbing device.

If further tests substantiate the practicality of the de-louser, the Department researchers believe that livestockmen will find the unit easy to build from material available on most farms and ranches. They found that the insecticide-treated burlap arrangement of the device was not only effective but safe, since it proved impossible for cattle to overdose themselves by rubbing against it.

Farm, Ranch & Home News

SHEEP MONEY BACK THE FIRST YEAR



Sheep prove a profitable crop on many farms. . .

Condensed from Kansas Farmer

WOULD you like an investment that would return the full amount of the principal the first year? In periods of favorable prices you can do just that with a ewe and early lambing program. Sheep can be added to any farming operation as a constant source of income, and with the least investment of any livestock program.

Total sheep population is down 3 per cent compared to last year and is 20 per cent below the last 10-year average. This means that there is an opportunity for you to get into either an early lamb or feeder lamb program with chances good for profits under proper management.

And sheep are not difficult to handle. They respond profitably to good management. In considering sheep you may have the following choice of programs:

1. A farm ewe flock: early lambing or spring lambing.
2. Fattening feeder lambs.
3. A purebred flock.

A good management outline for a successful ewe-flock program stresses 8 points. They are:

1. Purchase quality young ewes. They have the advantages of good teeth, sound udders, good health and vigor.
2. Use registered mutton-type rams. Select thick conformation rams of good type.
3. Produce good temporary and native pasture and quality roughage.
4. Produce early lambs (October, November, December).
5. Creep-feed lambs.
6. Market top lambs.
7. Market clean wool.
8. Follow a parasite- and disease-control program.

A farm ewe flock managed to produce early lambs has made the largest financial returns in Kansas and is adapted to many farms. A majority of the ewe flocks are made up of fine wool breeding ewes—that is, Rambouillet breeding.

Reprinted by permission from Kansas Farmer, Topeka, Kansas

Many persons think of these ewes as being western ewes from the range states. Some of the ewes are crossbreds, with the female parent of Rambouillet breeding. These ewes will breed earlier, so fit well into a November and December lambing program. It is usually not economical to save ewe lambs for replacements. In Kansas, it is better to buy yearling ewes each year from the range states for delivery about May 15.

Be sure to head your farm flock with a purebred mutton-type ram. His breed isn't as important as his quality and type. Use of purebred rams is a recommended practice to produce choice market lambs of good conformation. Use 3 to 4 rams per 100 ewes to shorten the lambing season.

Size of your ewe flock is important. The smallest farm flock should not be fewer than 40 ewes, as this number can be handled by one ram. A flock of 100 to 125 ewes is more efficient, but if the ewe flock is to be a major project then 300 or more ewes is best. If you have an efficient unit you will feel justified in buying top rams, providing adequate fencing, developing laborsaving equipment.

You may want to follow the plan used by R. W. Lukens, Mitchell county, Kansas. He says: "I started out with 35 ewes the first year, increased to around 75 the second year and am shooting for 100 ewes as a permanent flock. This gives you a chance to learn the business without too much invested the first year or two."

Timeliness in the early lambing program is very important. Let's start in spring with the ewe flock and their lambs. All lambs weighing 40 pounds or more should be weaned May 15 so as to keep ewes on the early lambing program. Ration of ewes should be reduced at this time to reduce milk flow and dry them off.

Next management problem is to flush ewes and yearling replacements May 20 to June 15. Flushing is conditioning ewes for breeding. It is done by putting ewes out on lush pasture, giving them ½ to 1 pound of grain per head daily, depending on condition of ewes. Whole grain such as milo, oats, barley, corn, wheat, or a mixture, may be used unless ewes are old. Then grain must be ground.

Rams also need conditioning for the breeding season. If healthy and in good breeding condition rams can be turned in with ewe flock June 1 and left for 6 weeks, until July 15. The practice of running rams with the flock at night and shutting them up during the day has several advantages. Rams can rest thru the day if provided a cool place.

Conditioning of the ram for breeding is overlooked too many times. A well-balanced, cool bulky ration can be fed so the ram is not too fat, but in good, thrifty condition. Trim his feet so they can travel normally. Rams need to be sheared before the breeding season, and kept in a cool place prior to and during the breeding season. Rams may become sterile if overheated, kept too fat, or if they lack thrift and health.

At the close of the breeding season separate rams from the ewe flock and keep them separate. If rams are permitted to run with the ewe flock continuously, a second crop of lambs will result and the timing of program will be lost.

Bred ewes can get all of their needed nutrients from good pasture following the breeding season (June 1 to July 15). This is the rest period for the ewe flock to build up and get ready for the lamb crop in October, November and December.

Bred ewes need ½ to 1 pound of grain daily, starting about 4 weeks before lambing season, and 1 to 1½ pounds of grain daily during the suckling period. Condition of ewes will determine amount of grain needed. This conditioning builds ewes up for lambing and suckling period. They will need 2 pounds of alfalfa hay per day or ¼ pound of high-protein supplement to provide their protein needs, in addition to dry roughage or silage. Force ewes to exercise by making them travel for part of their feed. This prevents lambing paralysis and promotes good health.

A legume hay solves many of your deficiency problems for minerals, vitamins and proteins in the ewes' ration. If lower-quality roughages are used, fortify them with high-protein supplements.

Silage is a very satisfactory roughage, especially as part of the ewes' roughage. Feed 1 pound of hay to 2 or 3 pounds of silage. Silage is satisfactory as the only roughage for pregnant ewes when fed with the right amount of protein supplement. Be sure silage is free from moldy and frozen material.

Lambs are creep-fed or hand-fed from birth until marketed. Lambs will start eating when 2 or 3 weeks old. Crack or roll grain for young lambs up to 6 weeks of age, after which whole grain is better. Corn and milo are good fattening grains and good alfalfa hay is needed for roughage.

College specialists say to market early lambs weighing 95 to 100 pounds in late April, May or early June. The market trend is higher thru this period and will bring you highest profits for doing a good job of planning.

Fattening feeder lambs offers you a market for roughages, milo stubble, cornstalk fields, wheat pasture and grain. Feeder lambs are bought in the fall (September-October-November) and fed for short or long periods, depending on size of lambs, kind of feed available, and facilities for handling lambs.

One advantage of feeder lambs is that you can purchase them after the feed supply on your farm is known. They also require less capital than other livestock feeding programs. The following outline will help you figure the amount of grain and roughage needed to fatten a feeder lamb.

Lambs may be used to clean up milo stubble or cornfields or can run on wheat pasture. They can be transferred to dry lot afterward if this source of feed runs out, or they may start in the dry lot and stay there thru the feeding period.

Feeder lambs will consume 1 to 1.3 pounds of grain per head daily during the entire full-feeding period, and .20 pound of high-protein supplement daily. If alfalfa hay is fed they will not need the protein supplement, and 2 to 2½ pounds of alfalfa hay will be consumed daily.

If dry, ground sorghum fodder is used as the only roughage feeder lambs will consume 2½ to 3 pounds per head daily. If ground sorghum fodder and sorghum silage are fed, it will be at the rate of 1 pound dry ground feed to 3 pounds of sorghum silage per head daily.

In considering sheep you should not overlook the wool sales. Wool will continue to be an important fiber. Figure returns from wool on a per head basis rather than per pound. Marketing wool thru producer-owner organizations has the advantage of returning a price based on quality of wool.

RATIONS FOR EWES

1. Quality legume hay, 3½-4½ lbs.
2. Legume hay 2 lbs., corn or sorghum silage 3 to 4 lbs.
3. Ground corn or sorghum fodder, 2 to 3 lbs. Legume hay, 2 lbs.
4. Grass hay, 2 lbs. Legume hay, 2 lbs.
5. Silage 3 to 4 lbs. Dry roughage—straw, hay, etc., 2 lbs. 1/5 to ¼ lb. high-protein supplement.
6. Wheat, rye, barley, brome grass, Sudan grass, or native grass pasture. Temporary or native pastures reduce the production costs, therefore a good pasture program to supplement native pasture is essential. Ewes do not need protein supplement feeds on good grass.

7. Ewes not on pasture will need some grain, ½ to 1 lb. per head daily, depending upon the condition and age of the ewes. Ewes going into the flushing period will need grain. Ewes preparing for lambing should have grain 4 weeks before the lambing season and during the suckling period. The grain needs will vary from ½ to 1½ lb. per ewe per day.

Lamb Rations in Creep

Whole grain—corn, milo, kafir—plus good legume hay. Mixture of grains may add variety. Lambs nearing the market period may need a protein supplement in the grain. A good ratio would be one pound high-protein supplement to 7 pounds grain.

Beef Cattle Situation

"On January 1, 1954, there were six percent more beef cows in the United States than the year before and 16 percent more than two years previous," says F. M. Simpson, South Carolina economist. "While it looks as if beef cattle production is still on the increase, the number of heifers was four percent less on January 1, 1954, than on January 1, 1953, and what looks like a trend toward decreased production of cattle is the fact that the slaughter of calves in 1953 was 33 percent greater than in 1952. At the present time, calf slaughter is running about 18 percent larger than a year ago.

"Fewer heifers on hand and an increased calf slaughter mean that there are fewer replacements for the slaughtered cows," he continues. "The percentage of cows being slaughtered has gradually increased each year since 1952. This year's slaughter is greater than in 1953. Such a trend is significant.

"A one-year increase in the number of cows slaughtered does not mean much," he points out. "But the second year may show importance as an indication of a decrease in cattle production, and if there are three years of increased cow slaughter, it's pretty sure that cattle production is being reduced. The Southern States appear to be going out of the beef cattle business faster than other sections of the country.

"From these figures and findings, cattlemen can take a more analytical view of the trend in their business. To these should be added the fact that every noon 7,000 possible new beef consumers come to the dinner table. This increase in consumers would likely take care of any lessened demand that might occur for beef production at the same level as in 1954," he concludes.

Clemson Agricultural College

WE'VE FOUND THE WAY TO STOP GULLIES

Reed canary grass can stop gullies, a way which can be used by any farmer and involves little expense. . .

Condensed from Successful Farming

George Harmon, U.S. Soil Conservation Service

AT last we have the gully-stopper we've been looking for—a method which stops active gullies dead in their tracks. No special machinery is needed, and there is little or no maintenance involved.

All you do is push freshly cut reed canary grass into the mud in the bottom of the gully. Within a few weeks, new plants develop. Their roots anchor the soil, permanently.

You can do a good-size gully or waterway in half a day or less—**and the best time to do it is when it's too wet for field work.** Based on our experience, here is how you go about it:

1. Do it at a time when the gully is wet and will stay wet at least three weeks.

2. Be sure the grass will not be shaded by trees.

3. Cut the green hay and haul it to the gully. A large pickup-load of hay will treat 500 feet of gully bottom, 5 feet wide.

4. Tramp or poke the hay into the mud to get it in close contact with the moisture and prevent its washing out while the new sod is starting.

Green shoots start in a week; roots start in two weeks.

To give you some idea how simple it is, Marvin Volkert and a hired man treated all the gullies on a 400-acre farm near Washta, Iowa, in one day. They used a mower, dump rake, and a silage wagon to haul the green hay.

William Hughes, south of Moville, Iowa, hooked a trailer behind a mounted tractor mower and cut his canary grass on a neighbor's farm.

The canary grass will immediately start to catch silt.

Reprinted by permission from Successful Farming, Des Moines, Iowa

Farmers report up to a foot of silting in one year's time.

Livestock should be kept out of the area at least a year until a mature sod is formed. Also, willows must be controlled, as the canary grass needs direct sunlight.

Reed canary grass is drouth resistant—but loves wet, fertile soil. It is not a weed and **will not spread into meadows or cultivated fields.** It will stand a lot of silting and will grow in water for extended periods.

Canary grass in a waterway can be used for hay or grass silage if cut twice a year. It also will produce good pasture. But livestock don't like it as well as brome or bluegrass.

It's possible you may still need a dam or special structure in some waterways—but canary grass established this way can protect the soil around them and make them more permanent.

When To Breed Cows

The best time to breed a cow is late in the heat period or even shortly afterwards. That is what we aim at now in artificial inseminations, and research underway at the University of Wisconsin looks as if it will prove the point.

Two researchers, V. R. Smith and P. W. Aschbacher, have been inseminating cows three times during heat periods. They made careful records of when the heat started, when it ended, and when the cow ovulated. For each of the three inseminations, a different breed of bull provided the semen. From the blood type of the calf, the three possible sires, and the dam, two of the bulls could be excluded as sire of the calf.

So far, 34 calves have been born to cows in this project. Ten of these calves were conceived at the first insemination 18 to 34 hours before ovulation; 14 conceived to the second insemination 2 to 18 hours before ovulation; and 10 conceived to the third insemination (from 10 hours before ovulation to 14 hours after ovulation).

Since two-thirds of these calves were conceived at the second and third inseminations (late in the heat period), this would seem to be the best time to breed, the researchers say.

They say that at present about 63 per cent of the cows bred artificially settle on the first service. Repeat calls to the 37 per cent that don't settle at the first service are important items of expense and inconvenience in the artificial breeding program.

Wisconsin Extension

CHANGING NATURE'S WAY IN THE ORCHARD

Higher yields, lower costs result from new, chemical thinning. . .

Condensed from Research and Farming

G. W. Schneider

CHEMICAL sprays for thinning apples may make it possible for growers to get better quality apples and a good crop every year at reasonable cost.

Research has shown that biennial bearing apple varieties such as Bonum, Golden Delicious, and others will produce a crop the following year if the fruit is thinned early enough and heavy enough. But apple growers have been reluctant to properly thin their crop early enough to obtain maximum increase in fruit size at harvest.

The cost of doing this early and heavy thinning by hand is so great that most growers feel they cannot afford it. As a result they almost always thin too late to control alternate or biennial bearing. Many often fail to thin at all because of the high cost of hand thinning and as a result there is much small, poorly colored fruit and tree breakage in the "on" year.

Studies in 1952 indicate that chemical thinning may help the apple grower reduce the cost of doing an effective thinning job when it needs to be done to obtain maximum benefits. Chemical thinning refers to the application of growth substances or hormones to the tree as a spray about 10 days to two weeks after petal fall. Delaying the spray until this time makes it possible for the grower to largely determine the amount of fruit set before application of the fruit-thinning sprays.

Two materials, naphthalene acetic acid (NAA) and naphthelene acetamide (NAM) have shown the most promise in North Carolina. A number of

Reprinted from Research and Farming, Agricultural Experiment Station, Raleigh, N. C.

other materials have been tested but do not now appear as promising as these two. Both materials have been tested on the Limbertwig, Bonum and Golden Delicious varieties.

All three varieties were thinned by spraying with NAA to 20ppm (parts per million). For growers accustomed to using NAA as a pre-harvest spray, 20 ppm is two times the strength normally used for that purpose. If applied about 10 to 14 days after petal fall (when the calyx has closed and the first drop has just started), NAA did not thin the first two varieties quite enough but thinned the Golden Delicious about right. This chemical thinning resulted in an increase in fruit size on the thinned trees of each variety.

The following year the NAA-thinned Bonum trees produced nearly a full commercial crop, whereas the trees that were not chemically thinned (but were hand thinned in late July, the first year of the test) produced only a very light crop the second year. Thus, NAA thinning sprays on Bonum trees not only increased fruit size but also increased total yield for the two years by getting two crops instead of one in the two-year period.

The NAA-thinned Golden Delicious produced a moderate crop and the unsprayed ones produced very little fruit the year after the thinning treatment. The NAM sprayed trees were thinned enough to improve fruit size but not enough to increase the next year's crop as much as the NAA.

Should Be Used With Caution

These materials are so specific that only a slight change in concentration can make a very real difference in the thinning results, so don't adopt the policy that if a little is good a lot is better. Since this is an orchard practice that requires the exercise of judgment it would be well to try it at several different concentrations on a few trees of the various varieties until you gain experience.

It is suggested that a spray of 10 or 15 ppm be tried on such varieties as Delicious or Stayman if they need thinning and a spray of 15, 20 or 25 ppm on Bonum and Golden Delicious, depending on tree conditions and fruit set.

Don't expect to do a perfect job of thinning with chemicals because there is always a possibility of over-thinning at least part of the tree. However, if you only thin off a half to three-quarters of the fruit that should come off it would be of much value in producing large crops of high quality fruit annually. Even if the trees are slightly over-thinned one year they will produce more fruit the next year, if other conditions are favorable.

THIS FEEDING GAME

An "Oldtimer" philosophizes about the perils and pleasures of feeding livestock. . .

Condensed from The Nebraska Livestock Feeder

A. F. Magdanz

THIS business of feeding is somewhat like a chronic disease. Once let a man get thoroughly innoculated with the proper "bug" and he will rarely quit until he is either dead or broke. Even occasional financial reverses—which are bound to overtake him sooner or later—are not apt to stop the confirmed addict as long as he can maintain his credit standing with his banker. This determination to try again is probably based on the theory that a severe market slump is likely to discourage enough of the in-and-outers to reduce supplies and enable the market to recover next year. Theoretically, at least, this reasoning should more frequently be right than wrong.

There is no denying the fact that large scale feeding on a strictly commercial basis is rather hazardous. Not many operators have become wealthy in that game, although there appear to be a few notable exceptions. The farmer-feeder who raises his own feeders and feed is on much safer ground. However, the man who is experienced at buying feeders, uses reasonably good judgment and has ample feed can be reasonably certain of a profit margin over a long period.

What is it that makes the feeding business so attractive to so many? There is, of course, the common and oft-repeated answer that it is a means of maintaining soil fertility and providing an on-the-farm market for forage crops and crop residue not otherwise convertible into cash. Both are valid rea-

Reprinted by permission from The Nebraska Livestock Feeder, Pierce, Nebraska

sons, but I doubt that they are ordinarily the only ones. An added incentive is I think, that most habitual feeders simply enjoy handling stock and wouldn't be happy unless they can mingle daily with their steers, pigs or lambs, depending on which are their favorite pets. Then, on top of that, is the element of chance. Most of us—whether or not we openly confess it—have more or less of the gambling instinct in our system which finds expression in repeated filling of our feed lots—win or lose. Happily, this is one game not yet prohibited by law.

Even if a feeder is overtaken by financial disaster because of a severe slump in the market or other adversity, he may not necessarily be down and out. I once knew a commercial feeder back in the 1920's who boasted that he was feeding 125,000 lambs on which a group of banks carried a split loan. When the last lamb had been marketed, these banks were holding the bag to the extent of about $100,000.00.

An officer of one of the banks told me later how they recovered their loss. In the year following the disaster, experienced by more or less severity by all feeders, feeder lambs were on the bargain counter. So, these creditor banks got together and agreed to furnish money for both lambs and feed for the bankrupt feeder. The result of this bold venture was that the banks not only recovered the amount of the charged-off notes, but the feeder had around $50,000.00 left for himself. Moral: If you must go broke, it may be wise to do it so completely that your banker will feel compelled to come to your rescue!

Livestock feeding is not for the lazy man. Unless one is willing to live with his stock and regularly provide their every need, he had better stay out of the business. Admittedly the non-feeder on the farm can take it much easier.

A few years ago I visited an area in a more southerly state where thousands of very choice calves are raised and almost invariably sold at weaning time to feeders in Illinois, Iowa, Nebraska and other states. I noticed that considerable corn was in cribs on most farms but no feed lots were visible along the highway. To satisfy my curiosity, I visited several farmers with cows and calves in their pastures along the way and found that they all sold their calves each year. When I inquired why they did it, the answer of one elderly fellow was typical: "Well, I'll tell you" he said. "I have corn enough on each of my two farms to feed out all the calves I raise but I prefer to sell 'em. I was offered $126.00 for my calves yesterday and that's easy money. The old cows run out nearly all winter and practically take care

of themselves, but if I fed their calves I'd have to do chores every morning and evening and wouldn't even have time to go visitin'."

He forgot to mention that he would also have to haul out the manure which his land so obviously needed. Perhaps it is fortunate for the more ambitious feeders that there are farmers, even in some sections of the corn belt, who seem to be too lazy to shovel corn into a feed bunk.

Lots of men grow old in the feeding business. Even if age and infirmity has curtailed his activity, the feeder who has the love of animals in his system, still gets much satisfaction and pleasure out of visits to his feed lots, especially if he is fortunate enough to have sons to carry on. The chances are that he will find there a steer or two that like to have their back rubbed or, if he is a lamb feeder, there will be some that venture up to nibble his pant leg the minute he sits down on the edge of a feed bunk. And whenever such a friendly relationship exists between a feeder and his charges, it is a safe bet that the latter are giving a satisfactory accounting for the feed they consume.

Vitamin A Shortage On Range

With most western ranges suffering from drouth the possibility of a vitamin A shortage should be considered by every stockman.

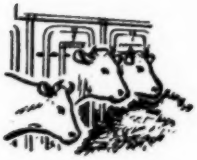
Vitamin A deficiency can be a problem in swine, sheep, and horses, but it is especially important in cattle. Cows may appear to be normal but breeding failures and weak, blind calves which cannot survive may result from this deficiency, says Albert Lane, Arizona livestock specialist.

Vitamin A is obtained from green feed by the cow and normally stored from 3 to 6 months in the body as a reserve during the dry part of the year. However, on many ranges there has not been enough green feed during the past six months to supply the vitamin.

One of the first symptoms of vitamin A deficiency in cattle is night blindness. However, the cow can be impaired in pregnancy and milking ability before the night blindness stage is reached.

Supplemental feeding of a good, green, leafy hay or good quality alfalfa meal high in vitamin A will help the cow drop and start the calf normally. If such feed is not available, commercial vitamin A in the form of fish liver oils can be used with the supplementary feed. *Arizona Farm News*

No Milk Fever in This Herd



How California scientists have "effectively prevented milk fever" by feeding grass hay and phosphorus to cows a month before calving. . .

Condensed from Hoard's Dairyman

Raymond Coppock

IT LOOKS as if milk fever, one of the most persistent and aggravating dairy disease problems, has been licked. That fact can now be told after two and a half years of experiments on a high-reproducing herd near Merced, California. Two University of California scientists who recently revealed it said flatly that their method, a special diet fed for a month before calving, has "effectively prevented milk fever" in the herd.

The scientists, Dr. J. M. Boda and Dr. H. H. Cole, don't claim that their method has been proven good for commercial use. But there is no apparent reason why it can't do for most dairymen what it has done for E. E. Greenough, owner of the test herd.

Three years ago Greenough's high-producing Jersey herd was plagued by milk fever. Certain cows, specially vulnerable, could be counted on to fall victim to the sudden paralysis after every calf. And the herd as a whole, with mathematical certainty, suffered a high percentage of cases.

Snce the first of last year, the scientists' latest diet has been fed to every pregnant cow in the test group. And this is chief herdsman Frank Benner's report: "We haven't had a single cow down with milk fever in all that time."

The spectacular success of the Greenough herd experiment is the result of an inspired hunch. What led up to that vital bit of scientific guesswork was this: For years it has been known that milk fever is caused by a sudden shortage of calcium in the cow's system. That shortage is a result

Reprinted by permission from Hoard's Dairyman, Ft. Atkinson, Wisconsin

of the rush of milk after a calf is born; so much calcium goes into milk that the cow's body is left short.

The result: A paralyzed, unconscious, and occasionally dead, cow. The best treatment has been calcium shot directly into the sick cow's blood stream.

It also was known that the parathyroid glands can boost calcium content of the blood, either by cutting down on the calcium thrown off or by getting more from the cow's bones.

The trouble is that these glands become relatively inactive while the cow is dry. Then, when a calf is born and lots of calcium is needed in a hurry, they can't get back into action fast enough.

Knowing these things, Dr. Boda and Dr. Cole reasoned: "The way to prevent milk fever would be to keep these paral thyroid glands in good condition while the cow is dry.

"The reason they are inactive is because the cow isn't giving milk so she can get what little calcium she needs directly from her feed.

"Maybe the thing to do would be to take most of the calcium out of her feed. That would force the parathyroids to keep working even when she is dry, and then maybe they could do their job after the calf comes."

When Grenough volunteered his herd for a test of the theory, the two scientists divided his older cows, those most likely to get milk fever, into four groups. During their dry periods each group was given a diet containing different amounts of calcium and phosphorus. (The phosphorus is important. Apparently, parathyroid stimulation occurs when calicum is low and phosphorus is high,)

Here's what happened: One group of 14 cows got straight alfalfa hay. This means about six parts of calcium to one part of phosphorus. Five of the 14 came down with milk fever. That was about average for Greenough.

Another group, 19 cows, got a special ration of oat, barley, and calcium carbonate . . . about the same calcium-phosphorus balance as alfalfa hay. Five of the 19 got milk fever.

A third group, of 20 cows, was given feed in which phosphorus and calcium were in balance. Only three of the 20 showed fever symptoms.

The last group, 16 cows, got the calcium-short diet, the one the scientists had put their hopes in. Composed of oat hay, barley, and monosodium phosphate, it contained one part of calcium to three and three-tenths parts of phosphorus. Not one of these 16 cows showed a single symptom of milk fever.

Then, to double check the results, the scientists took eight cows from this low-calcium group and put them on a high-calcium diet at their next calv-

ing. Four of the eight came down with milk fever.

Drs. Boda and Cole sum it up like this: "The results of this experiment indicate that low-calcium, high-phosphorus ration fed for approximately one month before parturition will prevent milk fever in dairy cattle."

Furthermore, they point out, none of the cows that were fed the least calcium got milk fever; a few (15 per cent) of those that were given a little more came down with it; and many more (30 per cent) of those that got a high-calcium diet were victims.

Conclusion: Not only does a low-calcium and high-phosphorus diet prevent milk fever, but the more calcium fed the more cows will get milk fever.

These results were based on only the early phase of the experiment which is still going on. Herdsman Benner at the Greennough dairy says that the cows on the low-calcium diet have done even better now. Twenty-six have calved since the first of the year and still not one symptom of milk fever.

Not only does the diet seem to work, it is practical, too. This is the formula for a ton of the low-calcium mix: 800 pounds of ground barley, 600 pounds of rolled barley, 500 pounds of wheat bran, 100 pounds of cottonseed meal, 40 pounds of monosodium phosphate, and 10 pounds of salt. Monosodium phosphate is relatively cheap.

"Each cow gets eight pounds of the feed per day, four in the morning and four in the evening. She also gets eight pounds of oat hay. And that's all," reports Benner. Oat hay is used because it is low in calcium.

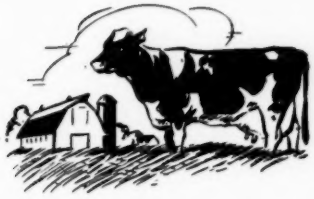
The cows gain weight on that diet at a period when good condition pays off in better calves. The diet doesn't seem to affect the cow's production.

Will the system work for all dairymen? Drs. Boda and Cole, of course, will not say that it will or that it won't. Their only conclusions, the ones they can back up with scientific proof, are that the diet has stopped milk fever in that one group of Greenough's herd. However, there is plenty of indication that the method will work for other dairymen, and none at all that it won't.

Obviously, it will mean most for those herds hardest hit by milk fever, in general, the high-production herds. Its cost will depend on whether or not a dairyman is now feeding supplement to dry cows. If he is, the additional ingredients won't make much difference.

And, too, it will be necessary to hold dry cows in a special feed lot. Says Greenough, "It looks like we can just turn our dry cows into a feed lot and stop worrying about milk fever."

CLASS LEADER FARMING



A New England dairyman has achieved outstanding success with his herd. . .

Condensed from Eastern States Cooperator

FOOTEHILLS farm in Gilead, Connecticut, has chalked up a $517 figure on its DHIA records for "value of product above feed cost" per cow. That's one item that puts this farm's dairy operations in the leadership class. And there are plenty of other items equally noteworthy.

The farm's 170 acres of grass spread over the lower slopes of the wooded hills in Connecticut's beautiful Glastonbury area. Owned and operated by Robert E. Foote, the father, and Edward A., the son, Footehills Farm is about as good an example of grass farming as one can find.

The cattle—130 head—and the milk they produce are made largely from the farm's own grass. On April 20, the milking string was feeding belly-deep in rye, the season's first forage. Sods . . . some of them over 30 years old . . . were sprouting thick growths of grass and legumes. The land is rocky and the farm is interlaced with big stone walls, testimony to the toil and determination of this property's owners from colonial days down to the present. The Footes have cleared out troublesome rocks, buried some of the walls, and smoothed the surfaces of their fields.

Sods get a liming that averages about two tons per acre every six years. The Footes use superphosphate in their stables all the time—about a pound a day per cow. They apply 300 pounds of **0-15-30** per acre to their alfalfa-brome stands and to the fields that have mixtures running about 50% ladino. Some of the oldest grass sods get 400 pounds of **8-16-16** per acre annually—and though some of these sods are 30 years old, they are pro-

Reprinted by permission from Eastern States Cooperator, Springfield, Massachusetts

ducing as much as four tons of hay per acre.

The Footes aim to grass-feed their herd the year 'round. They store about 600 tons of grass silage and about 150 tons of hay from second and third cuttings. This takes care of six months of barn feeding—and pastures do the rest.

The prime purpose of this grass-feeding program is, of course, to make the milk that makes most of the farm's income. But the way the Footes operate, the grass also **makes a herd of cattle.** Their use of grass in this respect is so effective that it belongs in "class leader" rating of good farming methods. The Footehills Farm stables are overflowing with big, handsome heifer stock . . . and not one head has been purchased since August 1945! Moreover, 31 of the 54 head in the milking string are two- and three-year-olds. Grass grown on Footehills Farm produces a good "crop" of milk cows to sell.

The present Holstein herd at Footehills Farm was established in 1919. Some registered cows were purchased then and their number has increased, but the herd continues to include some high producing grades.

The herd's production is "class leader" in merit. For instance:

Year	Milk	Fat	Value*
1953	13,121	477	$517
1952	11,994	436	494
1951	11,911	416	481
1950	12,224	458	468

*Value of product over cost of feed.

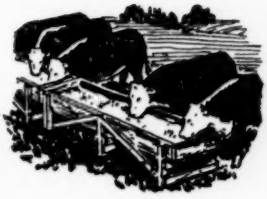
This kind of production, mind you, with about 20 first-calf heifers in a milking string ranging from 52 to 55 cows!

Another "class leader" merit badge for Footehills Farm is its early and consistent use of artificial breeding service to improve the inheritance of each generation of cattle on this farm. Bob Foote was a pioneer in advocating artificial breeding in Connecticut. He was a leader in getting the University to establish service in 1939—and he served his Tolland county breeding unit as first president. Now his state has its own breeding cooperative, the Connecticut Artificial Breeding Association, of which Footehills Farm is an active member.

In their DHIA the herds average 27 pounds of grain per 100 pounds of milk. The Footehills herd make 100 pounds of milk with only 23 pounds of grain. Barn-fed, the Footehills Holsteins get a feed ratio of 1-to-3. On pasture, it's 1-to-5 or 1-to-6.

Inspecting the Footehills herd, you'll notice that the cows are consistently in the "bloom" of good condition. Not fat. Not skinny. Udders look "milky." Hides and hair have the sheen of good health.

FEEDING MOLASSES TO LIVESTOCK



On a feed-value basis, molasses has been cheaper than corn for all but two of the last 15 years. . .

Condensed from U.S.D.A. Leaflet No. 352

Prepared in the Sugar Branch, Production and Marketing Admin.

In recent years, there has been a marked increase in the quantity of molasses fed to livestock. The use of this product as an ingredient in feed could be materially expanded, thereby benefiting both livestock feeders and molasses producers.

Why Feed Molasses?

Molasses makes roughage more palatable. Its addition to feed induces cattle to eat roughage they would normally refuse. This reduces waste and makes feed available.

Cuts Feed Costs

Molasses can be substituted, in livestock feed, for up to one-third of the more expensive carbohydrate ingredients, such as corn. Six and a half gallons of molasses has approximately the same feed value as a bushel of corn. When this quantity of molasses can be bought for less than a bushel of corn, then it pays to feed molasses.

There are other reasons, too. Molasses serves as a binding agent in mixed feed and it reduces the dust in them.

On a feed-value basis, molasses has been less expensive than corn in each of the last 15 years except 1943 and 1951. A comparison of the average New York wholesale prices for corn and molasses in 1952 shows that molasses was 69.8 cents cheaper on an equivalent feeding-value basis than a bushel of No. 3 yellow corn. During September 1953 molasses was $1.07 cheaper per bushel of corn equivalent.

What Is Feed Molasses?

Feed molasses is a byproduct of the sugar, citrus, and corn

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products industries and is considered inedible to the extent that it is not generally usable as food for humans. However, molasses is rich in energy value, highly palatable, and possesses other qualities that make it an excellent feed for animals.

The four types of feed molasses are: Blackstrap (cane molasses), beet, citrus, and hydrol molasses. **Blackstrap**, which accounts for the largest volume of molasses used in livestock feeding, is a byproduct from the manufacture of raw sugar from sugarcane and the refining of raw sugar. **Beet molasses** results from the production of beet sugar. The press water from citrus fruit juice production becomes **citrus molasses** after it is processed through evaporators. **Hydrol** (corn molasses) is a byproduct from the manufacture of refined corn sugar (dextrose).

All four types are rich in carbohydrates and contain such essential minerals as iron and calcium. Molasses also is a good source of niacin and pantothenic acid which are needed in swine and poultry rations.

Average quantities of total sugars, protein content, and percentage of Brix solids of the four types of molasses are as follows:

Type of molasses	Percentage of total sugars Percent	Percentage of protein Percent	Percentage of Brix solids[1] Percent
Cane blackstrap	48–56	1–3	79.5–86
Beet	48–52	6–10	80–85
Hydrol	60–64	(2)	75
Citrus	41–43	3–4	70–73

[1]Brix refers to a measure of density of a sugar solution.
[2]Less than 1 percent.

One gallon of hydrol, cane or beet molasses weighs 11.7 pounds, or 171 gallons per short ton (at a density of 79.5° Brix) Citrus molasses has an average density of 71° Brix, and weighs 11.3 pounds per gallon or 177 gallons per short ton.

Cane molasses (blackstrap) has a sweet taste and odor, and is readily eaten by all kinds of livestock. Beet molasses is similar to cane molasses. Hydrol (corn molasses) is higher in sugar content but it does not have the sweet odor of cane molasses. Citrus molasses also differs from cane molasses in odor and taste. However, animals quickly become accustomed to hydrol or citrus molasses and these are excellent carbohydrate feeds.

Most molasses is sold in liquid form, but molasses products in other forms are on the market. These are mostly dried molasses products and are derived chiefly from cane molasses and hy-

drol. Various carrying agents, such as corn-oil cake meal and bagasse pith, are used. These products are more expensive than liquid molasses but are easier to handle and mix.

Direct Feeding

When cane molasses is fed free choice, beef cattle normally consume about 4 to 6 pounds (⅓ to ½ gallon) daily per head. Beet and citrus molasses when fed free choice to cattle will normally be consumed at a rate of about 5 to 6 pounds (2/5 to ½ gallon) daily per head. When fed in recommended amounts, molasses does not produce any harmful laxative effects. Molasses frequently is beneficial when other feeds are constipating. Suggested amounts of beet molasses for animals accustomed to it are as follows:

Animal	Daily ration per 1,000 pounds live weight Pounds
Feeder Cattle	4 to 6
Dairy cattle	2.5 to 3
Sheep	3 to 5
Feeder pigs	5 to 10

It is recommended that animals be accustomed gradually to beet molasses. Breeding animals should be given smaller allowances than those being fattened. The amount of beet molasses should be materially reduced 6 weeks before the young are born.

In Mixed Feeds

In addition to adding palatability, settling dust, and serving as a binder, molasses may replace other carbohydrates in mixed feeds. Such replacement by blackstrap molasses may be as high as the following amounts:

Animal	Percentage of molasses per total ration Percent
Beef cattle	20
Dairy cattle	20
Work stock	15
Sheep	10
Swine	20
Poultry	6

Suggested quantities of molasses to be used in making silages

Silage	Quantity of molasses (per ton of crop ensiled) Pounds	Gallons
Legumes, fresh green:		
Alfalfa, red clover	80	6.8
Soybeans, Ladino clover	100	8.5
Legumes, wilted: All crops[1]		
Legumes and grasses mixed, before grass is headed out:		
Fresh green	80	6.8
Wilted[1]	60	5.1
Legumes and grasses mixed, after grass is headed out:		
Fresh green[1]	60	5.1
Wilted	None	None
Grasses and cereals before heading out:		
Fresh green	60	5.1
Wilted[1]	40	3.4
Grasses and cereals after heading out:		
Fresh green[1]	40	3.4
Wilted	None	None

[1]Preservatives may be omitted when the silos are smooth and airtight, and when recommended methods for filling silos are carefully followed.

As A Preservative

Molasses serves well as a grass-silage preservative. It is an inexpensive preservative and, in addition, at least 5 percent of the feeding value of the molasses is retained in the silage. The following tabulation includes the quantitites of molasses that are sufficient to accomplish the proper degree of fermentation in silage.

Poured on Roughages

Molasses is best handled by diluting it with one or two parts of water and pouring the mixture on roughages. It should be spread evenly on top of the roughage.

Pelleted With Other Feeds

The exact percentage of molasses to be used depends on the type of processing equipment and the type of carrier used. Pellets may contain from 15 to as high as 35 percent of molasses. At the higher level, however, the pellets sometimes disintegrate quickly when wet.

Most manufacturers guarantee that the lubricants used for the pelleting machinery contain no highly chlorinated naphthalene —a chemical that causes X-disease in cattle. Be sure you obtain such a guarantee.

With Dried Beet and Citrus Pulp

Beet pulp when combined with molasses and then dried, forms a molasses-beet pulp which is palatable, bulky, slightly laxative, and which will keep well in storage. Up to 30 percent of beet molasses may be satisfactorily dried with the beet pulp. This pulp is rich in carbohydrates and the protein content is about 9 percent. Dried molasses-beet pulp is used chiefly for feeding dairy cattle. Citrus pulp may be combined with as much as 30 percent of citrus molasses. This type of feed has about the same value as dried beet pulp and is consumed mostly by dairy cattle in Florida and neighboring States, as well as in parts of the Northeastern States.

Where To Buy Molasses

For users requiring only small amounts of molasses, the 55-gallon drum unit is available in major feed markets throughout the country. Some distributors offer molasses in 5- and 10-gallon tins or will fill individually owned containers. The needs of farmers and small feed mixers may be met by tank-truck deliveries. These deliveries to individual farmers and feed mixers are usually in lots of about 2,000 to 3,000 gallons, but in some cases lesser quantities may be purchased. Terminals from which tank-truck deliveries are made usually serve an area with-150 to 200 miles. Molasses may be obtained by tank truck in the Gulf States, the North Central States, Midwest, States along the eastern seaboard, and the west coast.

The most economical unit of purchase is a tank-car lot (6,000 to 10,000 gallons). Deliveries of tank-car lots of molasses are made to all parts of the country and may be ordered from distributors or brokers at major terminals.

Branch. PMA, U.S. Department of Agriculture, Washington 25, D.C. This report provides current market information on all types of molasses at all major terminals in the United States. Included in the report are weekly molasses prices, supply and

with tank-car deliveries.

The price of molasses in drums or barrels is higher than in any other form of delivery because of increased handling costs and the small unit of purchase. A user of small quantities may reduce his costs for molasses somewhat by furnishing his own containers and picking up molasses at the dealer's place of business.

(A weekly market report may be obtained from the Sugar

but such a purchase is less economical to the buyers. As in storage tanks for tank-car deliveries, tanks to receive tank-truck shipments generally should be larger than the unit of delivery. These tanks should be located near an all-weather road and elevated high enough to permit gravity flow into smaller distributing tanks.

For more detailed information on storage tanks, the indi-

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How Much Does It Cost?

The average price for molasses in tank-car lots at New Orleans during the first 6 months of 1953 was 10.7 cents per gallon. The New York price was 12 cents.

Prices for feed molasses delivered by tank truck are usually a few cents higher per gallon than the tank-car price at the nearest terminal. The delivered price for molasses in tank trucks depends on the quantity delivered and the distance from the storage terminal. Tank-truck delivery affords the cheapest means of obtaining molasses for users who do not require large enough quantities to justify tank-car deliveries. Tank-truck deliveries in several areas are competitive with tank-car deliveries.

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(A weekly market report may be obtained from the Sugar Branch. PMA, U.S. Department of Agriculture, Washington 25, D.C. This report provides current market information on all types of molasses at all major terminals in the United States. Included in the report are weekly molasses prices, supply and demand conditions both in the United States and in foreign countries, and market information on products related to molasses.)

What Equipment is Needed on the Farm?

In order to purchase molasses in tank-car lots (6,000 to 10,000 gallons), storage tanks are necessary at a rail siding. Storage capacity should be large enough to allow for the receipt of a carlot before the tank has been emptied.

Deliveries by tank truck may range as high as 3,000 gallons. Although some truckers prefer not to make deliveries of less than 1,000 gallons, others will deliver as little as 500 gallons, but such a purchase is less economical to the buyers. As in storage tanks for tank-car deliveries, tanks to receive tank-truck shipments generally should be larger than the unit of delivery. These tanks should be located near an all-weather road and elevated high enough to permit gravity flow into smaller distributing tanks.

For more detailed information on storage tanks, the indi-

vidual tank manufacturers should be contacted. A list of these manufacturers may be obtained by writing the Sugar Branch. The molasses distributor located nearest you would be glad to furnish advice and assistance in establishing handling facilities to suit your needs.

Approximate prices for various sizes of tanks are (1953) as follows:

Capacity Gallons	Gage	Weight Pounds	Price[1] Dollars
220	14	200	40
550	12	530	75
1,034	10	1,050	150
1,500	3/16"	1,500	200
3,000	3/16"	2,765	370
5,300	¼"	5,290	740
10,000	¼"	7,806	1,030

[1]These prices do not include delivery or installation costs.

A 500-gallon distributing tank may be mounted on a four-wheel-drive jeep for pasture distribution to feeding troughs. For users of large quantities this practice materially reduces labor requirements for on-farm handling.

Smaller distributing tanks (250 gallon capacity) mounted on a single-axle trailer serve well for molasses distribution to pastures. The cradle for this tank should be elevated enough to permit gravity flow through a bottom outlet. These trailer tanks may be towed by jeep, truck, or tractor to feeding troughs. In cold weather a molasses pump mounted with the trailer tank facilitates handling.

In order to make one feeding trough or self-feeding tank serve a dual purpose, it may be situated at the juncture of separate fenced lots, thus reducing the number of tanks required and the amount of handling of the molasses.

There are many methods for the self-feeding of molasses. **Small quantities of** liquid molasses may be fed quite easily from 55-gallon drums which have been cut in half from end to end and mounted on wooden blocks. (Care should be taken to smooth the edges of the metal.)

A drum of molasses may be inverted in a shallow tank or tight box, with the open end down (similar to a poultry waterer). The open bung permits the molasses to flow out and maintain its level as it is consumed.

A simple tightly constructed wooden trough serves well as a self-feeder into which molasses may be poured from drums or piped from storage tanks. To prevent wastage when molasses is being fed in this manner, floats should be placed on top of the molasses. These may be made of narrow boards spaced so as to permit the animals to lick up the molasses between the boards. Floats may also be made of jointed boards with holes of 2 or 3 inches in diameter bored through them.

Skid tanks of 200- to 500-gallon capacity offer an advantage over stationary tanks in that they may be moved from one location to another. These are tanks mounted on a framework having dual flat runners along the bottom.

Some further developments of the self-feeder have been through the use of an oval-shaped trough about 12 inches deep, 12 feet in length, and 1½ feet wide. Instead of the animals licking molasses directly from the trough, this type of self-feeder has a 4-inch pipe acting as a roller mounted at both ends and permitted to revolve freely while immersed about halfway into the molasses. This trough has a cover extending from the sides to within 1 inch of the roller which allows the animals to see the molasses and get it by licking the roller.

Before animals become accustomed to self-feeding, the molasses should be fed in limited quantities. Daily intake may be gradually increased up to amounts recommended for various animals.

For self-feeding larger amounts of molasses (several tons) 2- to 2½-inch float valves may be connected directly to the line coming from the storage tanks. This arrangement allows the use of several troughs at one time and eliminates the handling of drums, as the molasses can be delivered directly into the tanks where tank-truck deliveries are available. The float valves may be installed at one end of the trough so as to maintain a thin layer (about 1 inch) of molasses over the feeding part of the trough.

Wheat Carryover Predicted Largest In U.S. History

Americans next year probably will see the largest carryover of wheat in U. S. history, says A. W. Willis, extension economist at the University of Wyoming. Willis and other economists expect a carryover—as of July 1, 1955—of 915 million bushels.

Willis' figuring goes this way: The winter wheat crop forecast for 1954 shows 678 million bushels; March planting intentions indicate U. S. farmers will raise about 225 million bushels of spring wheat, giving a total 1954 production of some 900 million bushels.

Adding the 900 million figure to 875 million bushels of old wheat from 1953 makes a total supply of 1,775 million bushels after harvest this year. When we subtract about 860 million bushels estimated for home use and export, we have 915 million bushels left. *University of Wyoming*

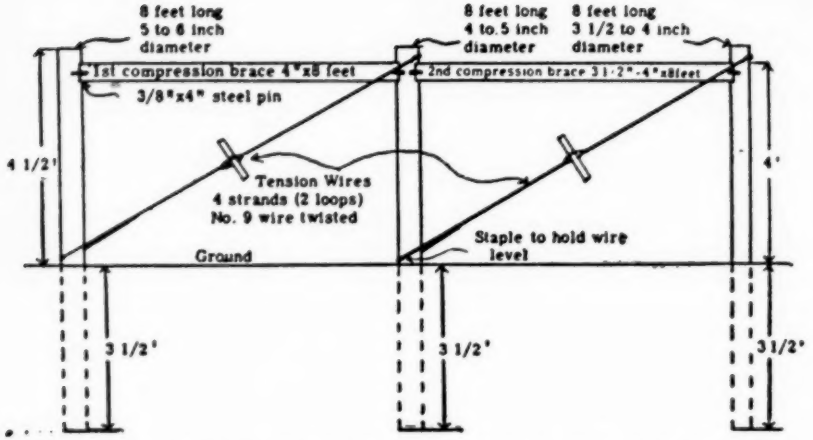

DIAGRAM OF DOUBLE-SPAN end-brace assembly, recommended by Missouri Agricultural Extension Service for modern fence building.

IMPORTANT TIPS ON FENCE BUILDING

The next time you go to town check the corner posts along the way. . .

Condensed from Missouri Ruralist

Cordell Tindall

SKILL in building a straight and true fence, like ability to plow a straight furrow, is much admired in farmers. But there is more to building a good fence than getting posts in line.

Recently, a fencing demonstration was held on the farm of George Hill, Clifton Hill, Mo. by County Agent Hugh Keith. "Visiting expert" was Carl Scheneman, Extension agricultural engineer. Mr. Hill readily admits he picked up some pointers.

Keith reports wide interest in the system of double-span, horizontal-type braces used. This

Reprinted by permission from Missouri Ruralist, Topeka, Kansas

system is not new. You will find it used in many fences. And it's catching on rapidly because it's simple and easy to install.

Next time you go to town check the corner posts along the road. Most braces are set at an angle that merely pulls the posts up out of the ground. And the only posts that are not leaning are giant, king-size posts, costly and hard to set.

The bracing system recommended by the Extension engineers uses much smaller posts that are quickly installed.

End and corner brace assemblies are shown in the diagram with this article. The horizontal braces are most successful in resisting horizontal and vertical cause of fence failure.

Horizontal braces can be of wood but many farmers use 1¼-inch galvanized pipe. Holes are bored in posts to receive ends of pipe. The pressure-treated creosote posts are 8 feet long, with 3½ feet in the ground. The brace wire, or tension wires, consists of 4 strands of No. 9 wire, twisted with a stick.

This horizontal brace assembly also can be used in constructing line braces — using only a single span. These line braces add strength to a straight fence and are very helpful in building a contour fence. They can be installed where the curve changes sharply.

On straight fence it is recommended line braces be installed every 40 rods.

This system of bracing is the heart of fencing recommendations of Extension engineers. But there are other features to good fencing.

Recommended distances for posts are from 12 to 16½ feet apart.

After posts are set in line, using a barbwire between the 2 end posts in lining up the fence, the TOP barbwire should be stretched and stapled.

Next, lower wires of the fencing are stretched to proper tension and stapled.

How tight should wire be stretched? Mr. Scheneman recommends that wire be stretched just enough to reduce the tension curve by one-half.

The tension curve is the crimp in the wire. If the fence is stretched so tightly the wire is straightened out there will not be enough "spring" in the fencing.

Here is an important point; drive staples in line posts diagonally with the grain—loose enough to allow wire to slip thru the staple. This will allow contraction and expansion all along the fence. Most of us are inclined to drive the staple in so the wire is embedded in wood —"to really hold it" we think.

Also, 1-inch staples are recommended for hard woods, 1½-inch staples for soft woods.

In stretching the fence it is suggested fence clamps made of 2-by-6's bolted together be used. If the fence is higher than 32 inches, more than one stretcher should be used.

To make his fence extra hog-tight Mr. Hill uses a clever wrinkle. He put in a barbwire just above the ground, then put the fence wire above that, with still another strand of barbwire on top.

Three common type f e n c e posts are most often used—steel posts, pressure-treated creosote posts, and native posts. The first will last much longer, but the life of native posts can be increased by using wood preservatives. Concrete posts also can be used.

When steel posts are used it is recommended every 7th post be of wood.

Need for a special type fencing has arisen in recent years—contour fencing. To make most efficient use of our water management system for soil conservation, we need to adapt our fencing to new field arrangements.

Normally, fences built on the curve need side anchors or braces, but these are in the way of farming operations. On contour fences it is recommended that posts be spaced 12 feet apart on gentle c u r v e s, 10 feet on moderate curves and 8 feet on sharp curves.

Posts should be leaned out about 2 inches when setting or driving.

Wire is put on the outside of posts on curves. The fencing should be stretched from end having least curvature, first. Then, stretch at 10-rod intervals on sharp curves, 20-rods elsewhere.

Stretch top wire first and stretch only one half to two thirds as tightly as in straight-line fence.

All of us recognized the value of good fencing. We all have seen instances where new fencing has been built on a farm and it gives the farm a "new look."

Albert Hagan, Missouri Extension farm management specialist, gives these excellent reasons why dollars invested in fencing pay good returns:

1. Good fences save time and labor—in repairs, maintenance, reconstruction and in handling livestock efficiently.
2. They protect livestock and crops from injury and losses.
3. They enable full use of all fields and pastures for grazing.
4. They permit "h o g g i n g down" grain crops and gleaning fields with livestock to salvage feed often lost.
5. They facilitate livestock management—such as breeding, feeding, watering, disease and parasite control.
6. They enhance appearance and sale value of the farm.

New Dry-Milk Bread Will Cut Dairy Glut

First report on a new process promises to lap up nation's surplus output of non-fat dry milk. . .

Condensed from The Farmer

A NEW way of making bread, developed in a bakery at Montevideo, Minn., is on its way to helping dairy farmers eliminate one of their surplus problems.

Called the American Dry Milk Institute Stable Ferment Process, the new method will double or even triple the amount of non-fat dried milk needed for baking bread. Once widely used by bakers and initial interest indicates it will be picked up fast, it could wipe out this nation's total annual surplus production.

The United States last year produced one billion, two hundred million pounds of non-fat dried milk.

Sixty per cent of that total was used up. Bakers used 259 million pounds. But another 40%—570 million pounds last year—was left to glut the market and depress prices.

Under this new process, that entire surplus could be eliminated.

Rather than use 1% or 2% non-fat dry milk (by total volume), as is now done under the old "sponge" method, bakers will be using 4% to 6% non-fat powder without danger of spoiling a batch of dough. And they will turn out a better loaf of bread.

Bread-makers will benefit. They will be able to produce bread in more compact, less-expensive equipment. Fewer operations will be involved, but a more uniform loaf of bread will result.

Bread-eaters will benefit. They will receive more nutritious bread. All the vitamin A, B, C and D, lime, calcium, phosphorus and other good elements of milk—everything, in fact, except the fat—will be baked into the bread at the equivalent rate of more than a glass and a half of non-fat milk per 1½-pound loaf.

Most important, dairy farmers will benefit. Stepped-up use of non-fat powder would al-

Reprinted by permission from The Farmer, St. Paul, Minnesota

most exactly balance surplus production in a year like this, wiping out the glut that otherwise piles up to strangle the market.

Credit for the new stable ferment process goes first to the American Dry Milk Institute, an organization of more than 200 of the foremost milk dryers in the United States.

Last June, Mac McLaren of ADMI, a technical baking expert, tried out the ferment process in Central Grocers Baking Company ovens in Montevido. The trial was successful enough for Roland Aaker and his Central Grocers plant to be given the job of perfecting the process at Montevideo. After nine months of trial, success was assured. An industry-wide meeting was called in Chicago on April 22.

Six hundred wholesale bakers and milk dryers heard the initial announcement. Since then, things have been moving fast.

The Chilean government cancelled an order for "sponge" type equipment for three bakeries and is constructing a new ferment-process plant. A baker from Norway flew to Chicago to attend the meeting. Representatives from Italy, Sweden and possibly other countries have been following developments of the process.

Bakeries in the United States from San Francisco to New York to Dallas to Boston have asked for sample loaves from Montevideo. Mr. Aaker is air-expressing 100 sample loaves a day, at the rate of two loaves to an interested bakery. One Chicago bakery rushed an order to Montevideo, via Western Union, even before he had finished telling about the new method in the Chicago meeting.

Increased use of dried milk is assured under the new process. Formerly, bread-makers began to trim down on their use of dried milk when the price got high. But under the ferment method, non-fat milk becomes the heart of the process, replacing flour as the stabilizing agent.

"Without the equivalent of two-thirds of the liquid in the bread being re-constituted dry milk, the resulting bread will not be salable," says baker Aaken. "This is the first basic change in bread-making methods since grandmother used to knead her own dough in a sod house."

Because it is a completely new process, however, switch-over by the baking industry cannot be made overnight.

"I figure, based on the process as it is now developed, that within five years 60% to 70% of the bread baked in the United States will be made by this process," says Mr. Aaken.

Do High School Students Get Real Farm Training?

This article calls attention to some weaknesses in our vocational agriculture and supervised farming courses in high schools. . .

Condensed from Farm Mangement

VOCATIONAL training in agriculture has a firmly established position in our high schools and the number of students taking these courses is growing year by year.

How successful are these courses in helping students to acquire the skills and abilities they will need to earn a living and live a comfortable life on a farm?

One way of studying this would be to survey the many graduates of such courses. Yet this would not be satisfactory for many reasons. Among the major ones is that the training program and farming are constantly changing — and presumably improving. Those who graduated some years ago and are now established in farming can not give an appraisal from their own experience, of the effectiveness of the program being used today.

One of the major changes in vocational agriculture is the increasing emphasis on the supervised farming programs. They are accepted as the heart of vocational agriculture; present teaching practice is to use supervised farming activities as the basis for class room instruction.

Prominent professional leaders in vocational agriculture have at various times taken a keenly critical look at supervised farming projects. Ivan Fay, a midwest state supervisor, pointed to a definite need for larger supervised programs when he stated: "Our present program of supervised practice leaves much to be desired, consisting too frequently of only one project, usually so small in scope as to fail to challenge the boy, or to command Dad's respect, and offering little chance for practicing better methods."

Positive Goal

Herbert M. Hamlin, a teacher-trainer of vocational agriculture in Illinois, stated the goal in positive form when he wrote

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that the central purpose of supervised practice was "to provide farm boys with a well-rounded farming experience so that they may learn to do what a good farmer must do."

In order to secure this broad experience it is necessary that the different agricultural enterprises of the community be represented in the supervised farming program; otherwise the curriculum is likely to become academic and the interest of the boys either lost or narrowed.

Hamlin re-emphasized this necessity by saying, "Supervised practice at the high school level should, ideally, be as broad as the course of study . . . " Hamlin went on to discuss the importance of a broad and balanced supervised farming program. In regard to the characteristics of a good supervised farming program, he said: "Consideration is given to the type of farming practiced on the home farm and likely to be practiced by the boy when he becomes a farm operator. If crop production is a major farm enterprise, projects are not confined to livestock."

Today's Program

Do present supervised farming programs satisfy these reasonable and widely accepted goals?

An intensive and comprehensive study of this question was made recently by Otto Mertz, a graduate student at the University of California, Los Angeles, in preparing his doctoral dissertation. Part of the investigation involved a summary and analysis of the records of the supervised farming program in California as reported in the annual state reports for the last 20 years.

Every method of analysis shows livestock projects dominating the supervised farming program.

In numbers, livestock projects represented 87.5% of all projects in 1952, leaving a humble 12.5% for crops. The percentage of livestock projects had been increasing steadily through the years. In 1932, the reports showed 77.5% in livestock, 22.5% in crops.

In time expended by the students, livestock received 76.5% and crops 23.5% of the students' time. In addition relatively few of the livestock projects were combined with supplementary crop projects. For instance, Mertz found that about 60% of the students buy all or most of the feed for their livestock. Less than 20% of the students raise any feed for their livestock. The remainder obtain feed for their livestock from parents and other similar methods.

Farming Pattern

How do these figures compare with the pattern of California agriculture?

In terms of income, the farming scene is quite the reverse of the supervised farming program. Only 34.5% of the cash farm income in California has been from livestock in the years 1937-51, and the remaining 65.5% of income came from crops.

To get more precise comparisons, several kinds of calculations were made. The results showed again that all kinds of crop enterprises were poorly represented in the supervised farming program. Among the livestock enterprises, swine were definitely over-represented, poultry were probably close to a balance and beef and sheep were still somewhat under-represented.

By any measurement, Mertz concluded, crops are not receiving the attention they deserve in training the young farmers of California.

Why did this happen? In turning back through the pages of time one important factor became clear: great popularity of livestock projects was aroused by the early influences of livestock fairs and shows. During the late '20s and early '30s, judging contests and participation in livestock shows and fairs received considerable attention.

In addition to the premium money secured from race tracks, valuable prizes and incentives are added by breed associations, stockyards, chambers of commerce, agricultural magazines and other agencies. S. S. Sutherland, California teacher-trainer in vocational agriculture, has said that such incentives motivated and promoted entire agricultural departments to the extent that " . . . life for many teachers and youngsters was spent preparing for, going to and recovering from s t o c k shows. In spite of the efforts of J. I. Thompson, livestock specialist, and the regional supervisors, many projects were developed primarily for show purposes. . ."

De-emphasis

The situation admittedly got out of hand. A percentage of the returns from pari-mutuel betting on horse racing was authorized for the support of the state fair and certain county fairs. Additional premiums for junior exhibitors resulted in an immediate increase in Future Farmers showing project products at fairs.

Competition for winning excessive premiums became extremely keen. Some boys in vocational agriculture bought expensive animals to feed and fit for these shows. Furthermore, the use of nurse cows, large quantities of costly concentrates and other non-commercial practices resulted in a loss of money in an unsuccessful attempt to win the championship.

After this condition had existed for some four years, the state

department of finance placed regulations against granting excessive premiums, and against exhibiting in too many fairs. Even though this attempt was made to correct the situation, the early livestock fairs and shows have left an impact which influences the thinking and planning of many boys in vocational agriculture today.

Orphan Crops

Similar incentives were not provided for boys to develop crop projects. It seems reasonable to suggest that this contributed to leaving crop projects as orphans for which little or no place exists in the supervised farming program.

Mertz points to at least two other important problems which receive little attention in the vocational agriculture program.

About a third of all students enrolled in these courses come from homes where parents are not directly engaged in farming. It is very likely that these boys do not have and cannot get, except with considerable difficulty, adequate facilities for supervised farming projects. In fact it is likely that only a relatively few of them will ever enter farming as an occupation, but may enter allied industries. Many of those who do go into farming will, at least in the beginning, be farm laborers.

This last factor is related to the second problem: the large percentage of large farms in California, reflecting the high and increasing capital requirements of farm operations. This means, in effect, that few vocational agriculture students outside those whose fathers own farms, will ever have a real opportunity to become farm owners.

Yet there is, intrinsically, nothing wrong with being a salaried worker on a farm except that there is no place where he may secure training which may help him to advance in his occupation.

Teachers' Views

What do teachers say about their supervised farming programs?

The training received by teachers of vocational agriculture appears to have a bearing on this problem. Throughout the years the number of teachers obtaining college majors in animal husbandry has far exceeded those specializing in crop production. Today, Mertz reports, at least twice as many teachers are employed with animal husbandry majors as with crops.

Yet many teachers are aware of this fallacy. One informant to the questionnaire made this comment: "In too many cases students live on crop farms and have livestock projects. Doesn't make sense. They later go into crop production—our records prove it."

In pointing out possible reasons why crop projects are not

more popular, another informant related the following observation: "To have crop projects one must get across to the boys in the community that vocational agriculture is not livestock farming entirely. Most of the boys with crop projects feel that there is no place for them in the program. They get this usually from observing stock shows and judging contests. Perhaps our local community shows should also contain some crop exhibits."

Still another respondent to the questionnaire maintained that good farming programs do not just happen. He concluded: "You will find that the areas that have good crop programs (even good livestock programs) have a person in charge who is highly enthusiastic and effective in that particular field."

Mertz states that other teachers of vocational agriculture listed the following obstacles which handicap them seriously in promoting more crop projects: 1) the difficulty of obtaining the use of land; 2) a lack of student interest in crop projects; and 3) the lack of equipment to carry such projects to successful completion.

Changes Needed

What can be done to make the supervised farming program correspond more closely to the pattern of agriculture? There are several problems, and a similar number of possible answers.

One of the problems lies in the 30% or more of the students who come from non-farm families; their chances of becoming established in farming are probably 1 to 9 or 10. Since many of them will go into enterprises related to agriculture, it seems reasonable to argue that specific programs should be provided for them.

Among such industries are those which provide farm supplies, like seed or nursery stock, feeds and fertilizers, and those which offer farm services, such as contract pruning or spraying and machinery maintenance and repair.

For those groups, some form of apprenticeship training or part-time "co-operative work experience" might well be the best course. Such programs are becoming well established not only in the trades but also for students interested in such fields as retail sales or office work.

To increase the number and value of crop projects, both incentives and facilities are needed. Crop projects are badly in need of the kind of sponsorship that livestock projects have received. Among the groups that might help are nurseries, seed companies, farm implement manufacturers and dealers, and similar firms.

Facilities Needed

Parents, school board members and others interested in the

school system certainly could consider the difficulty of obtaining land and other facilities for crop projects; some schools have found it possible to provide them or assist the students to obtain them.

One very promising step would be to encourage students with livestock projects to raise at least a large portion of the feed. This is a worthwhile combination project because it follows the common pattern of livestock production.

And another need—and one not easy to fill—is for teachers who can show students the challenge of crop production, along with teaching the elements of production and marketing.

Squeeze Test Silage Crop To Be Sure

How can you tell when a chopped hay crop is ready to put in the silo?

J. G. Hays, extension dairyman at Michigan State College, suggests the "squeeze test." It works this way: Squeeze a handful of freshly-chopped hay crop. If there's moisture on your hand the material is too wet for ensiling. If you can't make the material stick together by squeezing it, it's too dry. If a roll you're squeezing will spring apart slowly, the moisture content is right.

And how do you know when it's safe to chop from the standing crop if you don't intend to use a silage preservative?

Hays says that when grass makes up half the stand—as in alfalfa-brome, red clover-timothy—direct cutting and chopping is safe when alfalfa plants are well into the half bloom stage. If you don't have alfalfa in your silage crop, you can judge when to chop by the bloom stage of your neighbor's alfalfa.

If you're going to ensile a legume—alfalfa, red clover or sweet clover—alone, the crop should be in full bloom. Ladino clover, though, is a problem—it's still too juicy for direct chopping when alfalfa is past full bloom.

Use a preservative, Hays advises, when the direct-chopped material is too wet. Molasses should be used at the rate of at least 40 pounds per ton; corn and cob meal, at least 200 pounds per ton. You can know the tons per load of ensilage by dividing the cubic feet by 100.

If the crop is too juicy for direct cutting and chopping and a preservative doesn't appeal to you, mow and rake at once. Let the hay wilt in the windrow for one to three hours, then use a pickup chopper. The squeeze test will tell you when the crop is ready, Hays indicates. *Michigan State College*

GOOD WATER FROM A FARM POND

Proper treatment is the key to a bountiful supply. . .

Condensed from Electricity On The Farm

Dale K. Bee

THERE'S no water problem on the Joseph I. Williams farm near New Richmond, Ohio. Although he had a problem, he did something about it. The problem involved getting sufficient water for domestic use on the farm. To solve it, Mr. Williams built a one acre pond, 14 feet deep at the deepest point, which furnished all the water necessary for domestic and farm use. The system used to turn this unprotected pond into a source of pure water may answer the same problem on many farms.

A ¾ hp pump is used to pump the water from the lake into a holding cistern. This cistern is 8 feet across and 8 feet deep, with a wall dividing it into two sections. The water from the pond is pumped into the first section where chlorine is added in a proportion of two to five parts per million. This is done by a small, motor-driven, chlorinator. A 5.25 per cent chlorine solution is used in the chlorinator. Approximately one-half gallon of regular chlorine bleach added to 4½ gallons of water makes the solution.

This first section also acts as a settling basin and the water overflows the dividing wall, thus supplying the second section of the cistern. About once a month Mr. Williams uses a test block to check the amount of chlorine in the water. This is done by adding a few drops of orthotolidine to a sample and comparing its resulting color with a standard test sample.

Water level is maintained in the cistern by means of a float switch. As water is used, the switch turns on the pump from the pond. It also turns on the ⅛ hp pump on the chlorinator. The chlorinated water overflows and fills the second cistern section to the point where the float again shuts off the pond pump and chlorinator.

From the second section of the cistern a 1½ hp jet pump takes over. It has a capacity of 1,100 gallons per hour and pro-

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vides all the water for the farm and home. The pressure system operates about 10 pounds higher than normal — 30 to 50 pounds — to provide extra pressure for backwashing filters through which the water passes.

After leaving the pressure tank, the water runs through a neutralizing filter. This removes any acidity in the water as well as any remaining dirt particles.

Next, the water passes through a filter tank containing activated carbon. This removes any unusual taste, color or smell that may be left in the water. This filter has operated for two years without change and the neutralizing filter for four years. Both are backwashed every two to three months.

Mr. Williams says the system is not expensive to operate and requires checking about once a week. Frost proof hydrants around the yard make water available for the lawns and other extra uses.

More Superior Calves Possible With Egg Transplant

Dairy scientists are working with a method which may enable a superior cow to "have" as many as 100 calves in her lifetime. Using hormones, they "super-ovulate" a superior cow—cause her to produce 15 or 20 eggs in her 21-day ovulation cycle, in which she normally produces only one. These eggs are then fertilized by artificial insemination.

As they begin to develop and are still visible only with a microscope, the eggs are drawn out of the cow by "flushing". Each egg is examined under a microscope to see how it's coming along.

Then, it is transplanted—without surgery—into a different cow, where it develops into a fetus. Eventually, if everything goes smoothly, a calf is born. Strangely enough, although it develops in the body of a less outstanding cow, the calf will develop its original mother's and father's strong characteristics.

Only one laboratory has been successful in producing a live calf —the American Foundation for Animal Research at Madison, Wisconsin. However, workers hope the method will some day be practical on a herd basis. But there are many problems.

The egg must be transplanted into a foster mother which is at the same stage in her 21-day cycle as the "donor" cow. If the donor cow gives 15 eggs, for example, each of the 15 foster mother cows must be "Synchronized" by hormone treatment so that her cycle is at the same point as the donor's.

University Farm News

FEED MORE ROUGHAGE?

There is no substitute for good hay in getting the most value from energy-rich grain feeds. . .

Condensed from The Ohio Farmer

Orville Bentley, OHIO EXPERIMENT STATION

TODAY we hear and read about using more roughage for steers, lambs, and dairy cows as a means of cutting feed costs and overcoming the squeeze on the producer. There is also an attempt to replace the common roughages with waste products, such as peanut hulls, peanut skins, cottonseed hulls, and corncobs for greater economy.

How important is quality in roughages?

Color, leafiness, coarseness, and freedom from mold are all important but these are hard to measure. Scientists are trying to pin down roughage quality by a simple laboratory test.

What are some of the quality tests available today? Protein content is a fairly sound measure of quality if we know something about the type of hay or silage we start with. However, the protein content of hay varies with maturity and with the kind of hay. Hays, silages or mixtures which contain legumes are higher in protein than grass hays or silages.

Hay Maturity

Perhaps no single item has a greater influence on the quantity and quality of nutrients in hay or silage than maturity. The protein content of grasses can drop by as much as 50 per cent from the early cutting stage by letting it stand too long. Although we may get somewhat less total pounds of hay by earlier cutting, we get more protein.

Let us follow the digestibility of our hay through from early cutting to advance stages of maturity. Not only does the level of protein decrease, but the ability of cattle or lambs to

Reprinted by permission from The Ohio Farmer, Cleveland, Ohio

digest the hay can drop by one-half. Thus, by harvesting mature hay, either for silage or cured hay, protein is lost and the protein in the roughage is not as well used by livestock.

The fiber content increases rather than decreases, but, like the protein, the digestibility of the fiber drops off as greater maturity is reached. This is largely because of the presence of more of the plant-cementing substance called "lignin" which prevents good cellulose digestion in the rumen.

Although the green color is no assurance that the hay contains carotene, good green color in hay is a good indication that carotene, which has been converted to vitamin A, has been preserved. Ensiling of either grass, legume, or corn is one method of preserving carotene.

Minerals

Mature grass hays can be low in minerals. Steer-feeding experiments at the Ohio Agricultural Experiment Station have shown that a mature timothy hay does not supply enough of the trace mineral elements—manganese, cobalt, zinc, copper, and iron.

Roughages are the chief source of cobalt, for example. Thus, if cattle are fed poor quality hay in a fattening ration where hay consumption is of the order of two to three pounds per day per head, they may need extra cobalt. On the other hand, legume-grass mixtures, either as hay or silage, contain enough cobalt to supply the needs of steers or sheep.

Now about the use of some of our poor-grade roughages—corncobs, oat straw, corn stover, and so on. The late Paul Gerlaugh conducted studies on the use of corn and-cob meal for fattening steers. The results of this study bear repeating because some folks have misinterpreted the findings.

Ear corn contains roughly 20 per cent of cobs. Steers fed straight corn-and-cob meal used the cobs about 75 to 85 per cent as efficiently as corn for fattening. By doubling or tripling the amount of cobs in the corn-and-cob meal the efficiency of cob utilization for fattening dropped off to around 50 to 60 per cent.

This brings us to a significant point. Steer-fattening rations are high in energy but, unlike corn, grains, and corn silage, cobs are not high in energy. Steers (700-850 pounds) will eat 10 to 15 pounds of cobs daily in place of roughages. However, these rations become wintering or maintenance rations.

It follows then that corncobs can be used in place of good quality roughage for wintering rations, especially for larger cattle. Supplemental pro-

tein and minerals must be provided to balance the ration or to make up for the deficiencies as compared to better roughages. The same logic applies to other low-quality roughages, such as straws, hulls or stover.

Using Poor Hay

Livestock don't want to eat as much roughage when quality is poor. It becomes a problem to keep feed intake high. Some sheep experiments conducted at North Dakota by Earle Klosterman illustrate this point. Ewes fed low-protein native prairie hay failed to maintain their body weight. However, by feeding molasses or a small amount of grain the actual consumption of hay was increased and the ewes did a reasonable job of maintaining body weight and raising their lambs.

By and large, cattle and sheep fail to eat enough total pounds of poor quality feeds daily to meet their energy and protein requirements. You can provide supplemental protein, some of which may be as urea along with molasses or other highly palatable feed to get them to eat well.

Good-quality legume hays or silages are high-protein feeds that are balanced by energy feeds and little or no protein-rich feeds. Grass hays and corn silage are lower in protein. Corn silage is rich in energy-yielding nutrients. Steers fatten well on a little hay, a protein concentrate and corn silage. Grass hay, like legume hay, is not a high energy-yielding feed.

Good quality roughages are excellent for wintering cattle. Cattlemen of the Great Plains area usually feed only hay to cows and growing stock over long periods. Western cattlemen have no illusion of fattening their cattle during the winter on hay.

Permanent Pastures Improved by 2,4-D

Recent research indicates that two-thirds of a pound per acre of the amine salt formation of 2,4-D is the right amount to control most weeds in permanent pasture and result in a better stand of grasses without apparent damage to white clover or lespedeza, say specialists at West Virginia University.

Tests during the past three years in Mississippi and other areas, carried out in cooperation with the U. S. Department of Agriculture, show that 2,4-D is beneficial to pastures provided that it is used on established grass and legume stands and the rate does not exceed two-thirds of a pound per acre. Heavier applications injure the legumes.

West Virginia Extension

Know Your Soil Before You Subsoil

Subsoiling is not suited to all types of soil. . .

Condensed from Pennsylvania Farmer

Howard William Higbee

IN Pennsylvania the Agricultural Experiment Station in cooperation with the U. S. Soil Conservation Service and interested farmers is making a study of the whole question of both shallow and deep subsoiling.

Several years ago there developed a wave of enthusiasm for mole drainage. Many became so intoxicated with the idea that several operators purchased expensive mole draining equipment. They used it for one or two years and finally much of this equipment reverted to idleness where it accumulated dust or rust.

The enthusiasm was so great that soil scientists and agricultural engineers installed carefully designed mole drain tests in Clarion, Tioga, Montour, Centre and York counties. Some of these installations at first appeared very promising but six months later every test was a 100 per cent flop. The results of the work were so conclusive that it will be many years before any one will have the courage to reopen the question of mole drainage.

Recently there have appeared a number of reports and a few magazine articles that boast rather elaborate claims for deep subsoiling as a means of (1) loosening up the subsoil, (2) promotion of deeper rooting of crops, or (3) storage of more water in the soil for the drier summer months.

The idea of deep subsoiling seems to be revived from time to time, or in ten or twelve year cycles, but to date there is very little if any conclusive evidence that deep subsoiling really pays off in cold cash. There is some experimental evidence that clearly shows that exceptionally deep (10-14 inches) plowing may prove to be more harmful than beneficial.

A critical evaluation of both

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soils and deep tillage, or subsoiling, strongly indicates that some soils may respond to deep plowing or subsoiling, whereas a large number of soils may be severely damaged by exceptionally deep plowing or subsoiling. Some of the factors that must be considered before one sets out to do deep plowing or subsoiling are as follows:

Four Factors

1. One of the first factors to consider is the value of the crop that is to be grown, for deep subsoiling is an expensive proposition. There is great doubt as to whether deep subsoiling would be beneficial to shallow-rooted crops (small grains and grasses). Deep subsoiling may or may not be beneficial to corn or alfalfa. In any event, subsoiling probably wouldn't be profitable unless the crop grown has a high cash value per acre.

2. Deep subsoiling in early spring or when the subsoils are wet may be very damaging to soils. The writer knows of places where deep subsoiling was responsible for the development of deep gully "wash outs." Deep subsoiling in greasy clay soils may actually reduce the rate of water drainage from subsoils during the wet seasons. Deep subsoiling of clay subsoils must be done with extreme caution wherever the soil is over-moist or wet. Some observations indicate that subsoiling should not be done until the subsoil is quite dry. Perhaps the months of July and August would be the best time to do subsoiling.

3. Farm machinery over the years has become more massive and much heavier than most horse-drawn equipment ever was . Most modern tractors are now equipped with rubber tires which tend to compress, pack, or "roll out" the soil. The overall result is a compressed or packed plow sole. The thickness of these plow soles may range from two to ten inches depending on the kind and quantity of clay in the upper subsoil and the amount of moisture present in the soil when much of the plowing was done. It is entirely possible that these plow soles are restricting the intake of rainfall and the penetration of crop roots into the lower subsoil. Some very careful studies should be made to determine the advisability of equipping the plow with a subsoiler so designed that it will loosen up the plow sole to a depth of five or six inches below plow depth. If the plow sole is to be loosened up the writer is of the opinion that the bottom of every plow furrow should be subsoiled. There is a very real question as to the advisability of subsoiling to depths in excess of 15 or 18 inches in Pennsylvania soils.

4. In Pennsylvania there are more than 300 different soils. Some of these soils (Hagerstown, Chester, Duffield, Mur-

rill, Clymer, Gilpin, Ashby, Calvin, Dewart and several others) do not need subsoiling for they already have open, porous, and well-drained subsoils.

There are also a number of soils (Cavode, Volusia, Watchung, Croton, and several similar soils) that have tough plastic clay subsoils that refuse to respond to any kind of subsoil treatments. Deep subsoiling in these soils is definitely questionable and may prove to be very damaging if done when the subsoils are over-moist or wet. The question of subsoiling stony soils can become very involved, especially in most of the glacial soils of northern Pennsylvania.

Push Pigs for Early Market

Push pigs for the early market, advises A. W. Epp, Nebraska agriculture economist. Hog numbers are up 10 per cent over last year. He expects hog prices to follow the usual seasonal trend next fall and not go up in November and December as in 1953. Epp suggests that farmers could farrow the usual number of sows in the fall of 1954 as the corn-hog ratio is likely to be favorable through most of this year.

More Cows Being Artificially Bred

Figures reported by State Extension Dairymen show that for the year ending December 31, 1953, a total of 4,845,222 cows were bred artificially. This is an increase of 549,979, or 12.8 per cent, over the previous year. These cows were in the 606,997 herds enrolled in 1,432 artificial breeding organizations in the 48 states, Alaska, Puerto Rico and Hawaii. The record for 1953 further shows that 25 states had 40,000 or more cows bred in artificial breeding organizations, Wisconsin again leading with more than 907,000.

The number of cows bred per sire in the United States was 1,865 in 1953. This compares to 228 cows bred per sire in 1939; 332, in 1944; 1,078, in 1949; and 1,848, in 1952. The percentage of cows bred to proven sires in 1953 was 37 per cent. This compares to 20 per cent, in 1944; 26 per cent, in 1949; and 30 per cent, in 1952.

The average mature equivalent production for all daughters of proven sires used in artificially breeding studs in the United States is 10,564 pounds milk, and 413 pounds of butterfat.

U. S. D. A.

BISULFITE SALT ON SILAGE

Costs about 75c per ton for green, sweet silage. . .

Condensed from Breeders' Gazette

R. L. Cowan, J. W. Bratzler and R. W. Swift
PENNSYLVANIA STATE COLLEGE

PRODUCTION of huge yields of highly nutritious crops is to no avail if a large percentage of their nutritive value is lost in harvesting and storage.

Two principal methods are in common use in insuring proper preservation of silage. The first depends upon the addition of readily fermentable carbohydrates in the form of molasses, cereal grains, etc. These furnish fuel for an acid-forming type of natural fermentation which results in an accumulation of organic acids in sufficient concentration to stop bacterial activity. This method is known to produce good quality silage under most conditions and has been widely used. However, ground grains are rather expensive and molasses is difficult to handle. In addition it has been claimed that their feeding value is largely lost in the fermentation process.

The second general method consists of the addition of chemicals which produce conditions unfavorable for fermentation and spoilage; thus, the grass is preserved in a more or less fresh state. Various mineral acids, including hydrochloric, sulfuric, and phosphoric have been used for this purpose. Their function is to produce immediately a condition too acid for bacterial activity. In this same catagory, sulfur dioxide (SO^2) gas has been used with considerable success.

Sulfur dioxide has been used for many years in the preservation of human foods, specially dehydrated and fresh fruits. For this purpose it generally has been applied in the form of the acid sulfites of sodium or calcium, which are **powders** or **crystals** and much more convenient to work with than liquid or gaseous SO^2.

Preliminary experiments conducted during 1951 had shown that sodium bisulfite applied as a water solution was quite effective in preserving grass silages stored in glass jars and in one

Reprinted by permission from Breeder's Gazette, Spencer, Indiana

small concrete silo. The results of these experiments seemed sufficiently encouraging to warrant more extensive studies in 1952.

It was felt that if the same preservative action supplied by acids or SO^2 could be obtained by applying sodium bisulfite in the dry powder form, the problem of application would be considerably simplified. With this in mind, an applicator for powdered bisulfite was constructed from the fertilizer attachment of a corn planter of common make. This device was driven by a ¼-hp electric motor geared to turn the shaft of the applicator at about 60 revolutions per minute. The applicator was calibrated by means of an adjustable opening so that, at this speed, a given weight of the bisulfite powder would be delivered in a given period of time. This made it possible to obtain any desired rate of application under the varied procedures of unloading wagons and filling silos.

This applicator was mounted on a portable table which could be set up near the blower at the silo. A cylindrical spout was attached to the device in such a way that the powder was sprinkled onto the chopped grass as it entered the blower housing.

The bisulfite powder, which was shipped to us from the manufacturers in 100-lb. paper bags similar to those used for fertilizer, was found to be quite free-flowing and easy to work with. It had no tendency to lump even in damp weather. According to present price quotations, the material would cost farmers 60 to 70 cents per ton of silage treated.

At the farm of William H. Geist, one 10x40-ft concrete stave silo was filled with alfalfa and timothy cut before the alfalfa started to bloom. Bisulfite was applied at the rate of 8 pounds per ton. Mr. Geist fed this silage to his herd of Jerseys and Holsteins at the rate of about 60 pounds per cow per day. Here is what he had to say: "Sodium bisulfite preserved my grass silage last summer. Here are some of the reasons I like it: (1) It is very easy to apply. (2) The grass comes out of the silo with a nice green color. (3) It has a sweet odor. (4) The cows like it. (5) It does not have as much acid in it as some other preservatives; it does not rust the handling utensils as quickly. I used both grass and legumes separate and mixed and found them all preserved the same."

At the farm of Paul A. Wasson, State College, Pa., one 10x40-ft steel silo was filled with an approximately 80% legume mixture containing largely sweet clover, alfalfa, red clover, and timothy. This material was so juicy and wet and so rich in legumes, that one neighbor remarked that "any preservative

that will make good silage out of that will keep anything." Bisulfite was applied at the rate of 8 pounds per ton. Mr. Wasson fed all of this silage to his herd of about 90 purebred Guernseys. He took great pride in showing visitors the excellent condition of his cattle, and how they "go for" the bisulfite silage. His silage had a bright green color and the very pleasant odor of freshly cut sweet clover.

The variety of conditions covered by these experiments necessarily has been limited by lack of time, manpower, and facilities. However, it is felt in view of the excellent results obtained so far, that the use of sodium bisulfite may be highly recommended as a preservative for grass silage. There is no known reason why it will not work satisfactorily in any situation where sulfur dioxide gas has been used successfully.

Eight pounds of bisulfite per ton may appear to be a small quantity as it is being applied, but it is enough. Ten or twelve pounds per ton will do no harm but is wasteful. Larger excesses (three or four times the proper amount) will cause bleaching and will affect the palatability in much the same way as an excess of salt in human food.

Does A Break In Growth Hurt Beef Calves?

The USDA Experiment Station, Beltsville, Maryland has been conducting research to answer this question. They used pairs of identical twin calves in the test. Their scientists say that feeding for rapid, continuous gain in order to market beef at the earliest possible age is still the more profitable plan when feed prices are low enough. But they believe their work has proved that when feed prices are temporarily high, cattlemen may well carry young animals as long as 6 months on a maintenance ration that meets all the nutritional needs other than energy requirements for growth. Such a ration must contain sufficient protein, carotene, and minerals so the calves, when returned to a full ration, will be healthy and capable of resuming normal growth. They are now preparing to investigate how much "sufficient" actually is. The protein level of the ration will be investigated first. At present there's little information available on the protein requirements of calves that are being fed just enough energy to maintain their body weight. The research results so far indicate clearly that the slowdown in growth of the calves resulted primarily from the low energy value of the limited ration.

Meaty News

Fog Fire Fighting

New development holds great possibilities for rural fire companies. Use this article to check your local fire department. It may save your farm. . .

Condensed from Nebraska Farmer

C. L. Hamilton

IN THE last decade the most important development in the science of fire fighting is using water in the form of a fine mist. In this form, water has an enormous capacity for absorbing heat and quenching fires.

This permits tremendous savings in the amount of water required and the resulting water damage. The misty fog also protects firemen from heat, smoke or gases, simplifying quick entry and close-range operation. When equipped and trained to use fog fighting techniques, most rural fire districts will multiply their effectiveness many fold.

Fog fire fighting equipment, plus a new product, a "wetting agent," added to the water, will undoubtedly replace most of the old conventional type equipment for rural fire fighting. With this new method 500 gallons of water or less is all that is required for about 75 percent of the rural fires. This makes it practical for fog equipment to carry its own water supply for most farm fire runs.

With conventional equipment using a solid stream of water, 5,000-6,000 gallons or about ten times as much water was generally required for ordinary farm fires.

Heretofore inadequate water supply has always limited the effectiveness of rural fire fighting districts. Hydrants with unlimited water were not available on farms as in cities. Special concrete cisterns and ponds were recommended as alternatives in rural areas, but these large man-made water storages were expensive and only a comparatively few were ever installed. Only a few fortunate farmers had a natural lake or stream in their backyards. Under these condi-

Reprinted by permission from Nebraska Farmer, Lincoln, Nebraska

tions equipment and fire fighting methods developed for cities were handicapped and unsuitable for rural areas.

Water fog and spray nozzles in fire service is about as old as fire fighting itself. Its merits and effective nozzle designs or applications, however, remained undiscovered until World War II.

To thoroughly appreciate the effectiveness of fog for extinguishing fires you must understand the action of water on fires. Water extinguishes fire by absorbing heat and reducing the temperature of the fuel below the ignition point. When water is poured on a fire in large volumes or in a solid stream, it quickly flows off to a lower level and often does damage on the way. The limited surface exposed and the short time the water is in contact with the fire, does not allow it to absorb more than a fraction of the heat that it is really capable of absorbing. Most of the extinguishing agent is actually wasted.

When held in contact with the fire, water will absorb heat right up to and even after it has turned to steam. It absorbs nearly six times as much at the moment it is turning into steam, as it does in being heated to the boiling point. It is obvious therefore that water has not approached its maximum efficiency in fire extinguishment until it has turned to steam.

The rate or speed at which water will absorb heat is directly proportional to the water surface exposed to heat it is to absorb. By breaking the water up in very small particles, a much larger water surface is exposed to the heat of a fire. The smaller the particles of water the larger the surface area exposed. Each of these little particles absorbs heat and turns to steam much more rapidly than it could if it were part of a solid body of water and the cooling action is distributed over a wider area.

This is the reason fog extinquishes fire so effectively with a relatively small amount of water and with very little water damage or waste. Less water is needed in the first place to obtain the same amount of cooling, a larger area is cooled at one time, and, finally a much greater percentage of the water is dissipated in the air as steam. Any method of applying water, that increases rate of heat absorption during the time it is in contact with the fire, will increase its fire extinguishing efficiency.

When water turns to steam it has absorbed close to its maximum heat, but its usefulness in extinguishing fire has not ended. Steam itself is an effective extinguishing agent. When water turns to steam, it expands 1,700 times. This rapid expansion tends to displace oxygen in

the atmosphere and produces a blanketing or smothering effect on the fire.

With further research and investigations, the advantages of water fog over a solid stream may continue to multiply. Already it has proven its effectiveness and it is undoubtedly destined to play a major, if not a leading role in fire fighting practices of the future.

High Losses Reported In Stack Silage

A Minnesota extension agronomist has come up with some startling figures on the cost of spoilage in grass silage stacks. He says spoilage loss in a 12 by 20 foot stack is equal to the feeding value in 35 100-pound bags of soybean oil meal.

The agronomist, Rodney A. Briggs, says the reason is that there's no good way to pack stacks and without good airtight packing silage can't ferment properly. Also, a stack's outside "shell" of silage is bound to spoil and that means an initial heavy loss because so much surface is exposed.

Brigg's advice is to think twice before stacking. He points out that just one year's saving in feed value, figured in terms of high-cost protein, often will pay for a structure that allows proper packing and greatly reduces spoilage. Naturally, silage that ferments properly in such a structure will be more tasty, nutritious and valuable. And it'll smell much sweeter, too.

A good structure can be an upright trench or horizontal silo at ground level—the important thing is airtight walls to pack against and some way of shielding the exposed silage on top.

Briggs adds that preservatives are a good bet and often mean the difference between a properly fermented, nourishing and sweet-smelling feed and a sour mess that cattle avoid. If cattle could talk, he adds, they would probably describe this poor silage with one word—"ugh!" *Minnesota Extension*

Foot Rot—Foot rot in cattle and sheep can usually be cured in less than a week with one penicillin injection given during the first two or three days of lameness, reports an Oregon State College veterinarian. In tests on the college herd, average cases were cleared up in three to seven days with 300,000 units of penicillin per 100 pounds of body weight. Foot rot infection is caused by bacteria that thrive in mud and filth and is likely to spread from infected animals to healthy ones. It may extend through the summer and into the fall, especially when animals are on irrigated pasture or swampy ground.—*Better Farming Methods*

BARN HAY DRYING

Its effectiveness depends on free movement of air. . .

Condensed from Science For The Farmer

A. W. Clyde and J. A. McCurdy

THE PROVERB, "Make hay while the sun shines," is fine except for the fact that the sun does not always shine when haymaking time comes.

Many farmers now are using fans to finish the drying of hay in the barn. This helps reduce the damage from showers and also saves loss of leaves because the hay is handled when in a tough condition. Another advantage is less risk of fire from spontaneous combustion. No case is known of a barn burning from hot hay with a barn drier.

The high narrow hay mow, the common style in some states, has presented problems in getting air distributed uniformly through the hay. For example, a mow, 18 to 20 feet wide with hay 16 feet or more deep, cannot be handled in the same way as a mow 36 feet wide with hay perhaps 10 feet deep. Air will follow the path of least resistance. With the narrow high mow some means must be used to assist the air in getting to the hay at the top of the pile. This is necessary to prevent too much loss of air out the sides and resulting slow drying of the upper part of the mow.

Three things are being done to get air to the upper part of the high narrow mows. These are:

1. Make the duct high—A single duct usually will be adequate in a narrow mow provided the duct is quite high and the hay will be piled only moderately high above it. For example, if there is 8 feet of hay on each side of the duct, it is best to have only 7 feet of hay over it.

2. Vertical flues. – Vertical flues in the hay can be made over the main duct and lateral ducts when hay will be piled higher than 7 or 8 feet above the duct. The flue-formers are pulled up

Reprinted from Science For The Farmer, Agricultural Experiment Station, State College, Pennsylvania

as the mow is filled, leaving holes in the hay permitting air to get easily to the upper part of the pile.

3. Provide a secondary duct.— This has been done successfully in very high mows. In one case, a vertical riser was built up from the main duct. The riser was closed until the hay reached the top of the riser. It was then uncovered, sections of duct were laid on the hay, and these sections were covered with more hay. In one case, a second fan and frames for making a second duct were provided. These were supported by the hay. The lower fan did the drying in the lower part of the mow, and the upper fan was used for the top when the mow was full.

A barn drier works best if the resistance against which the fan works is low. The fan then will deliver more air than it will if the resistance is high. This is particularly important when the power on the fan is limited to a 5-horse-power motor. The resistance which the fan must overcome is the air pressure in the duct, often called static pressure. It is measured by the height of a water column which the duct pressure will support. Rural service men of power suppliers often have the equipment used for measuring duct pressure. For large air flow and best results in drying, the pressure should not be over ½ to ¾ inch of water.

This low resistance requires a large area of open duct in contact with the hay so the air can enter the hay with little resistance. It also requires that the air have rather short paths through the hay. An ideal to strive for might be that the air go through not more than 8 feet of hay. We should not expect to blow air through 12 feet of hay without paying a penalty. The penalty will be more resistance, less air flow and slower drying.

Supplemental heat is being used by growers of big tonnage to increase their drying capacity. Some of these men use natural air during good drying days and add heat at night and on humid days. Drying on wagons with supplemental heat also is being done by a few hay growers. Good air distribution is fully as important with heat as with natural air. Air should not be wasted after expense has been incurred in heating it.

Beef bacon is the newest item for the breakfast table. Cured and smoked, it looks like regular pork bacon but it's leaner and doesn't fry as crisply. Beef bacon is now available at many chain and individually-owned markets. At Fort Atkinson, Wisconsin, beef bacon sold handily at 65c per pound while good pork bacon was priced at 85c.

He Milks 84 Cows in 2 Hours

A combination of good ideas makes Howard Faulkner's milking parlor efficient. . .

Condensed from Farm Journal

John Ternus

HAVE you ever stopped to figure how much time you spend herding cows into and out of the barn? Howard Faulkner did when he planned his new dairy layout in Glen County, Calif. As a result, Marvin Tate, his tenant, washes, feeds, and milks 84 cows in two hours—by himself!

And it's not two hours of mad scrambling for Tate, either. It's a sensible, step-by-step operation.

When Faulkner got the idea of building a milking parlor, he didn't just grab up the first set of plans he saw. He snooped around, picked out ideas that looked efficient, and thought up a few of his own.

Basically, his layout consists of a loafing corral, a holding corral, and an eight-cow, walk-through milking parlor with narrow entrance and exit alleys.

The cows go into the loafing corral a couple of hours before milking time, so they can eat hay and relax.

Between the loafing corral and the milking parlor, Faulkner put a smaller corral with a cement floor, for holding the cows before they go into the parlor.

Right there is where Faulkner eliminated the first big time-waster. He built metal fences on each side of the corral leading up to the barn. At the far end he mounted a movable gate on rollers that ride on top of the fences.

Before milking, Tate runs half of the herd into the holding corral. Then, when he wants cows in the milking parlor, he simply opens the parlor doors, and pulls a chain that's fasten-

Reprinted by permission from the Farm Journal, Philadelphia, Pennsylvania

ed to the movable gate. The gate, with the aid of an electric wire strung along the inside of it, prods the cows toward the parlor.

Tate recognizes each cow as she walks into the parlor. With a twist of a crank, he meters out grain from overhead hoppers, the amount depending on the cow's production.

A quarter-turn dumps a pound of grain into a trough, bolted to a track-mounted partition. Tate shoves the partition in front of the cow to hold her in place in the walk-way and to feed her.

Then he picks up the water hose (there's one beside each of the eight cows), and gives the udder a quick spray to loosen the dirt.

As soon as he has one line of four cows fed and udders wetted, he steps to the other side of the parlor, runs in four more cows, feeds and sprays them.

Then Tate returns to the first line, washes the loose dirt off the udders, and puts on the four milking machines. The milk flows through a stainless steel pipeline to a 1,600-gallon holding tank in an adjoining room.

When a cow comes in that has mastitis, or is just fresh, or when Tate wants to hold milk for testing, he connects the milker to a special line that carries the milk into a can instead of the main tank.

When one line of cows is milked, Tate switches the machines to the cows across the alley. Out go the milked cows through an alley that runs alongside the holding corral.

The only break in the entire chore period comes when Tate has to drive the remaining half of the herd from the loafing corral into the smaller holding corral. But the machines keep on milking while he does it.

Cleaning the parlor after milking is no big job, either. At the turn of a valve, water shoots from pipes beneath the walkway grating. It flushes the manure off the sloped cement floor, beneath the grating, and into a sump. From there it's pumped into the fields with the irrigation water.

What did this set-up cost? About $15,000, plus another $7,000 worth of equipment. That includes the milking machines and steel bulk tank. Admittedly, that's no small cost. But considering the size of herd it handles, with only one man doing the whole job, Faulkner doesn't think it's too expensive.

THIS YEAR WE DIDN'T PLANT OUR POTATOES IN THE LIGHT OF THE MOON. We just planted them in the garden. If they cry their eyes out we'll blame it on the onions.

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Veterinarian's Notebook No. 7

NOT A JOB FOR THE LAYMAN

Cleaning a cow or a sow is a job for your vet, but you should know when and why to call him. . .

Condensed from Farmer and Stock-Breeder

I CAN think of few worse jobs than cleansing a cow, especially when the weather is hot and the cleansing has been left a bit too long. It's not the job itself but the unpleasant reminder of it that clings to your arms however hard you wash.

It's not so bad now that most cows calve in the cold weather, but now and again in the summer it can be awful.

There seems to be a great difference of opinion amongst farmers about how long a "cleansing" or afterbirth should be allowed to remain in the womb.

There are some who think it should be removed at once and there are others who believe in "letting nature take its course."

It is necessary, however, to understand how afterbirths vary in the different animals.

In the cow the foetal membranes, or "afterbirth," which have been supporting and nourishing the calf while it is in the womb, are attached to the lining of the womb by a number of "cotyledons."

Food-Bearing Blood

It is through these cotyledons, which are a series of fleshy "bulbs," that the food-bearing blood of the mother passes to the developing calf and the waste products from the calf pass back into the mother to be excreted.

In many cases the afterbirth comes away from the womb within a few hours of calving, but in other cases, especially when the cow has calved prematurely, the afterbirth is retained.

The reasons for its retention are not always clear but nowadays there is a lot of support for the theory that retained afterbirth is due to a deficiency of hormones.

These hormones are the secretion of glands inside the cow's body, and it is such hormones which are responsible in the first

Reprinted by permission from Farmer and Stock-Breeder, London, England

instance for bringing the cow on heat.

That is why there are some cases of retained afterbirth which will respond in a matter of hours to an injection of one of these hormones given by your veterinary surgeon.

Not all cases, however, respond to this treatment, and indeed there are quite a few which still require "manual" removal.

It is not just a case of pulling on the cleansing but a careful removal of the afterbirth from each one of the cotyledons to which it is attached. There are some four dozens of them.

If the cleansing comes away cleanly, then the insertion of antiseptic pessaries will do all that is necessary to clean up the uterus or womb. However, it is sometimes found that the cleansing does not come away cleanly and tends to break off into pieces and following such cases the cow tends to develop a chronic inflammation of the womb known as the "whites" or leucorrhoea.

These animals will usually require irrigation of the womb before being put to the bull next time.

When a cleansing is left unattended the cow might develop an acute inflammation of the womb. This is extremely dangerous and may even kill the cow. The animal goes off its food, the milk yield drops, temperature rises up to 105 or perhaps higher and there is a foul-smelling b r o w n i s h discharge from the vagina.

Such cases require immediate treatment if the animal is to be saved and even if she is saved, it may lead to an incurable sterility.

The same general principles apply to the ewe also.

In the mare the matter is quite different and of a much greater urgency. Here the afterbirth is in close contact with the lining of the womb all the way round and it is necessary in the newly foaled mare for the afterbirth to be removed in a matter of hours.

The mare does not have the resistance to infection that the cow possesses and unless the cleansing is removed quickly and efficiently she will rapidly develop an acute inflammation of the womb which in turn often leads to acute "fever in the feet"—so that even if you are lucky enough to save her life she may be incurably lame for the rest of her time.

Don't delay with the mare. If the cleansing is not passed in **one complete piece** within an hour of foaling, then get your vet at once.

Different Problem

The sow offers a problem all of her own. Each young piglet has its own complete set of foetal membranes and these are gener-

ally delivered with the piglet.

However, there are cases, especially when the litter has been a large one and the muscles of the womb have become tired, that a set of membranes are retained.

Usually in such cases the sow does not let her milk down, she is off her food, and the young piglets are obviously hungry and are not sucking as they should.

Again there is no time for delay. An injection to contract the womb and perhaps another to kill out infection are all that are necessary.

These are the possible results of a retained cleansing. You may have a dead animal, one that is incurably sterile, or one that is incurably lame. I don't like cleansing cows, but it is not a layman's job.

National Real Estate Values Decline

The average decline in farm real estate values throughout the United States was 2 per cent for the 4 months ending in March, the decline being somewhat larger than the average in most of the States affected by the drought and lower cattle prices last year and in several Mountain States.

Some strengthening in prices of farm commodities since last fall has helped to slow the rate of decline in farmland values which was under way in the latter half of 1953, according to a report from the U. S. Department of Agriculture.

A sharp increase in hog prices and more favorable returns from cattle feeding tended to sustain land values in some States. But farm commodity prices are likely to weaken later this year under the pressure of the large output currently in prospect and large carryover stocks in several major commodities, the report states. Some further decline in farm real estate values by next fall can be expected under these conditions, continues the Department of Agriculture report.

In contrast with the strong farm real estate market during 1951 and 1952, the report indicates that the market is now much more selective in most areas, with better farms moving more readily than those considered below average. In the fringe areas of the Corn Belt, the drought areas, and portions of the Southeast and Mountain areas there are fewer cash buyers, and many prospective buyers cannot meet the financing requirements of lenders. A seller often must make a substantial concession in price if he wishes an immediate sale or if he does not want to assume part of the financing.

University of Nebraska

YOU CAN WHIP COCCIDIOSIS

You'll have fewer losses and lower costs if you use a medication or vaccination program. . .

Condensed from Poultry Tribune

M. Glen Kirkpatrick

THIRTY years ago poultry experts were searching frantically for a practical way to control coccidiosis—a big profit thief of the poultry business.

Extensive research was conducted by scores of poultry workers, using hundreds of drugs and chemicals and hundreds of thousands of chicks. They were searching for something that could be used to destroy coccidiosis "bugs" (oocysts, the scientists call them) within the chicks' bodies, without hurting the chicks.

Their work has paid off. Now we have preventive and control methods for whipping coccidiosis, including medication through feed and water and vaccination to immunize chicks against coccidiosis.

The first real break came when the sulfa drugs became available. One after another of the sulfas was found to be active against coccidiosis organisms. Then the nitro-group of chemicals entered the fight. Members of the nitro-group valuable in coccidiosis control include nitrophenide, nitrofurazone, and certain other bisphenol derivatives.

The sulfas and nitro-compounds were first used in drinking water or in feed intermittently to check coccidiosis losses. As one drug after another was tried, the researchers found some of the drugs and chemicals effective at such low levels that they could be used continuously and would prevent coccidiosis without harming the chicks.

The drug used in the feed checks the growth of the parasite and allows the bird to develop an immunity to coccidiosis. It isn't desirable to eliminate all of the coccidiosis "bugs."

Reprinted by permission from Poultry Tribune, Mt. Morris, Illinois

The only way a bird can develop immunity to any type of coccidia is to have a controlled light attack. Drugs keep the growth of the parasite under control while the chicken is developing immunity.

While the continuous use of medicated feed prevents most outbreaks of coccidiosis, under certain conditions, an outbreak may occur. In such cases, follow the directions of the manufacturer of the drug you have been using. Usually the treatment consists of using the drug at a higher level of concentration in the feed or drinking water.

You also would use this higher level treatment to control a coccidiosis outbreak if you hadn't used medicated feed before the outbreak.

Feed manufacturers are now offering commercial starting and growing mashes medicated with sulfaquinoxaline, sulfamethazine, nitrofurazone, nitrophenide, and other nitro-compounds. Poultrymen mixing their own feeds are also medicating mashes for coccidiosis prevention and control.

Another development in coccidiosis control is the so-called vaccination method for immunizing chicks against cecal coccidiosis. Briefly, the method consists of feeding coccidia organisms to chicks at three days of age. Thirteen days later the chicks are given a mild drug treatment. By 17 days of age most of the chicks have permanent immunity to coccidiosis. This treatment has passed the laboratory stage and a coccidiosis vaccine is now on the market.

But medication should not be expected to take over the entire job of coccidiosis prevention and control, any more than good management practices were able to lick "coxy" in the days before effective drugs had been found.

Medication must be accompanied by good poultry raising practices. It doesn't make sense to encourage coccidiosis, just because medication can get the best of it. It isn't stretching things to say that medication is just another item of management to fortify what has been known all along as a good poultry raising procedure. Good management makes medication all the more dependable.

Chicks first pick up coccidiosis organisms from the ground or from the litter. In the intestinal tract of the bird, the oocyst multiplies rapidly and releases a large number of coccidia organisms. Four to seven days after the chick first picks up the oocyst, new oocysts are present in the droppings.

The coccidia organisms attack the duodenum, small intestines, cecal pouches, or large intestines, depending on the species of the organisms.

Much can be done to cut down

on the spread of coccidiosis by good management practices. Clean houses and equipment, new ground, and all around good management make medication all the more dependable.

If the brooder house is clean when chicks are started, the first generation oocysts do little damage because they are too few. Picked up by a chick, they run a development cycle of 8 days inside its body. Then, when they leave the chick in its droppings, they go through another two-day cycle in the litter.

One oocyst swallowed by the chick is represented eight days later by a million descendants in the litter. By the time chicks are two weeks old, the increased number of second generation oocysts are being picked up and swallowed by chicks. These are the most serious; they cause weight losses and start runts even ahead of the time when heavy death losses of chicks occur.

Deep, dry litter, stirred daily, serves to interfere with the development of this litter-cycle.

The oocysts are spread in various ways—on a poultryman's shoes; by use of equipment contaminated with droppings from infected birds; by insects, sparrows, wild birds and rats, etc. Susceptible birds pick up the oocysts and swallow them with feed and water.

What can a poultry raiser expect from the intelligent use of medication? There are two things he can expect—fewer runts—which add up to lower net chick raising costs and greater feed economy.

Reports tell of coccidiosis losses ranging from 10 percent to 100 percent among infected chicks not treated for coccidiosis. But these losses are heavier than most poultrymen experience. Under favorable poultry farm conditions, a loss of 3 percent to 5 percent is experienced.

In one test, where birds were raised under practical poultry farm conditions, the loss from coccidiosis in a 246-bird group without medication, was 4 percent. In another group in the same test, handled the same way except that they were given medicated feed for coccidiosis control, the death losses were less than 1 percent.

But death losses resulting from coccidiosis don't tell the whole story. Profit losses from stunted, runty birds may be several times the death losses. In the test just referred to, birds in the treated group outgrew the untreated ones, and averaged 4½ ounces heavier than the untreated ones at 12 weeks old. There were numerous bareback birds in the untreated group.

Some of the runts among the untreated birds weighed only one pound at 12 weeks—not worth the feed they ate. A pen

of broilers like that wouldn't be very profitable. Or would you want to fill your laying house with pullets from such a group? They certainly wouldn't set any profit records.

It should be obvious then, that when you practice coccidiosis prevention and control, you don't have to start as many replacement chicks and you'll have more and better finished broilers at market time.

As for feed economy, there is evidence that $1 spent for medication to prevent coccidiosis may return as much as $20 or more to the poultryman because of fewer death losses, fewer runts, and better weight gains.

Where Were The Milk Boys???

At the National Restaurant Association convention in Chicago, approximately 900 exhibitors displayed their wares to the people who serve one quarter of all the food consumed in the United States. One exceedingly attractive exhibit was the Tea Center. This occupied a series of connecting booths over which was a master caption reading "PROOF YOU CAN DOUBLE YOUR ICED TEA SALES." Smaller captions called attention to the wisdom of increasing tea sales, both hot and iced. Tasty samples of tea were passed out to visitors and a group of pleasant attendants who were "bubbling over" with ideas, told the restaurant folks how to double their tea sales. Here we are with too much milk and an ever increasing problem as to how to dispose of surplus dairy products, which could be solved to a great extent by the consumption of one additional glass of milk per capita per day, yet no booth or exhibit was noted with the caption: "HOW TO DOUBLE YOUR MILK SALES." The milk boys "missed the boat."

Northwestern "Ag" Letter

PROTEIN SUPPLEMENTS, when nutritive values of the ingredients are comparable, should be compared at time of purchase on the basis of the cost per pound of protein in the feed, rather than compare the cost by bag or ton. This point is often over-looked by farmers when they purchase their protein supplement requirements for their livestock. The price per pound of protein can be obtained by dividing the per cent of protein in the supplement into the cost of a 100 pound bag of feed.

NEW CHEMICAL KILLS WEEDS IN VINE CROPS SAFELY

Cucumbers and some of the squashes can now be kept free from weeds by chemical sprays. . .

Condensed from Farm Research

Robert D. Sweet, PROFESSOR OF VEGETABLE CROPS, CORNELL UNIVERSITY

VINE crops have recently joined the ranks of vegetables that can be weeded with chemicals. It is difficult to realize that truly selective chemicals for weed control in vegetables came into existence just 10 years ago; 2,4-D for corn and Stoddard Solvent for carrots were the two materials that gave tremendous impetus to the development and use of what is now a long list of herbicides that can be used safely on vegetables.

Until recently, the vine crops —cucumbers, muskmelons, watermelons, and squash—were considered the group of vegetables least likely to tolerate a chemical weed killer. In fact, cucumbers have long been used as a laboratory guinea pig to determine potency of new herbicides, because the plants are sensitive to so many different kinds of chemicals.

Chance Discovery

Were it not for Dr. G. F. Warren, Jr., we would probably not yet have a chemical that is safe for weeding these crops. He discovered Alanap (trade name for N-1, naphthyl phthalamic acid.) almost by accident, in a study on defoliating tomatoes. Alanap was a promising vine crop herbicide, although the manufacturer had labeled it as a defoliant.

In 1953, growers in many areas of New York, as well as throughout the country, used Alanap on a trial basis. Their experiences, together with research results from the Ithaca Experiment Station and elsewhere, confirmed Dr. Warren's prediction

Reprinted from Farm Research, Geneva, New York

that this material was outstanding in its performance on several of the vine crops. However, the 1953 results also emphasized the fact that Alanap is not foolproof and must be used with care and caution on most of these crops.

Furthermore, it is definitely not safe to use on many of the squashes. A glance at the figures below will show that, in some instances although the number of fruits is not reduced, the total tonnage is substantially lowered. It is apparent, also, that of the three varieties listed, Butternut is the most sensitive. Additional research has revealed wide differences among kinds of squash in response to this chemical. Farmers are urged, therefore, to try Alanap on only a a few plants until they are certain that the variety they are growing will not be harmed.

Typical data showing injurious effects of Alanap on squash

Variety	Number of fruits per acre	Tons per acre
Blue Hubbard:		
Alanap—4 pounds	3,680	11.3
Alanap—6 pounds	3,960	11.2
No chemical	3,640	12.7
Buttercup:		
Alanap—4 pounds	4,320	5.6
Alanap—6 pounds	3,280	4.3
No chemical	4,000	5.0
Butternut:		
Alanap—4 pounds	7,280	5.6
Alanap—6 pounds	6,840	4.8
No Chemical	8,680	7.2

Cucumbers, muskmelons, and watermelons are much more tolerant of Alanap than squash. In almost all tests at Ithaca, and in most grower trials, good results were obtained. Both weed control and crop response averaged better with pre-emergence sprays than with those applied after the crop was above ground. Alanap is definitely more effective as a preventer than as a killer of established weeds. Repeated sprays were usually harmful to the crop and usually not necessary for good weed control if the original application was made early enough.

Soil Moisture Important

Soil moisture after treatment greatly influences the effectiveness of the spray. A moist soil surface is necessary for best results. If there is no rain within 3 to 5 days of treatment, irrigation, at the rate of at least ½ inch, must be supplied. Under dry surface soil conditions the chemical is relatively inactive, and also weeds sprout several inches below the treated surface; these can easily come up through the inactive chemical layer. Moisture not only activates the chemical but also tends to wash it into the soil so that it comes into close contact with the germinating weed seed.

Growers of muskmelons are especially anxious to know whether Alanap causes off-flavors. Extensive tests by food panels have failed to show any

effect of the herbicide on melon flavor.

Suggestions For Vine Growers

1. Use Alanap on only a small part of your acreage, unless you have had previous experience with it.

2. Do not use this chemical on squash unless you are certain the variety you grow will not be harmed. The common varieties of cucumbers, muskmelons are tolerant of Alanap.

3. Apply Alanap at the rate of 2 to 4 pounds per acre. Use the lower rate on light, sandy or gravelly soils.

4. The rate given is for an entire acre. If only a strip over the row is to be treated, reduce the amount of chemical proportionately. These sprays are safest and most effective if applied before the crop has emerged.

5. Do not treat more than once with the chemical.

6. If rain does not thoroughly wet the surface soil within 3 to 5 days after spraying, irrigate the crop at the rate of a least ½ inch.

Want To Move To The Country?

About 31 per cent of all farms in the U. S. are part-time and residential farms, reports R. C. Suter, Purdue University. He says many people are now combining farm living with a basic source of livelihood from outside agriculture—either a business in town or a job in industry.

Part-time and residential farming is increasing mainly because of the increased satisfaction from living in the country, says Suter. City people often move to the farm in order to better utilize excess family resources and to reduce the cost of living by raising a few products for home consumption. In town they find very little or no spare-time employment available.

Contrary to common opinion, says the economist, part-time farms do not represent an undesirable element in the rural community. Actually, they have increased the wealth of a number of townships, which have otherwise witnessed a decline in farm population.

The popularity of part-time farming today serves to emphasize what some people may have forgotten—that farming "as a business" is not as important as farming "as a way of life and source of satisfaction."

Purdue University

ARE YOUR CATTLE GAINS TOO COSTLY?

Is it costing too much to put gains on beef animals? . .

Condensed from The Shorthorn World

R. T. Burdick, COLORADO A. AND M.

IN ALL the discussion of cattle feeding, one important fact seems to be overlooked. It costs too much to put on a pound of gain in feedlots under present conditions. Let us look at the record.

The economics and sociology section of the Colorado agricultural experiment station has secured from cooperating farmers records of their winter feedlot costs for many years (1922 to date.) During that time, cattle feeding methods have changed, but the change has not been toward lower costs of gain.

In the years prior to World War II, the feed cost per hundredweight of gain was $9.89 for cattle and $10.25 for lambs, according to these records. In the six years, 1947-52, the feed cost per hundredweight of gain for cattle was $27.29 and for lambs $19.81. In the earlier period it cost more for feed with lambs than with cattle. In the recent period, it cost very much more for feed to put gain on the cattle. Why?

The answer may be found in several places. But the most obvious cause is the fact that in recent years these farmers fed approximately twice as much grain per head each day as they did in the earlier period. (14 pounds in 1947-52 vs. 7.2 pounds in the earlier period.) Heavier steers were fed in this latter period which also explains in part the heavier grain ration.

In the past six years, feed prices have gone up about 60 percent, compared to the earlier period. The feed cost per hundredweight gain of cattle in these Colorado feedlots has gone up 176 percent, compared to

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only 93 percent for the lambs. This great increase in feed cost for cattle is due quite largely to the heavier grain ration now being fed to cattle.

Incidentally, white feeder lambs are now purchased at heavier weights (both feeder lamb and feeder steer purchase weights in the past six years were approximately 10 percent heavier than before World War II) yet the grain fed to lambs per head per day is now actually less. Farmers have not changed their feeding methods for lambs and thereby have held down rising feed costs.

The main purpose in all winter feeding is to use local farm feeds for the production of meat, thereby giving the farmer productive work for the winter months, and putting farm roughage into the form of edible human food. How to do this at the least cost is the key to long-time profits. Recent experiments reported to animal husbandry investigators show that it is still possible to make satisfactory gains with farm roughages and a low daily grain ration. Isn't it time to consider this important way to cut feeding costs?

"The Southern beef cattle industry is operating about 25 percent below the efficiency of the national average," stated Dr. J. C. Miller, head of the animal husbandry department, Texas A. & M College.

Dr. Miller's suggestions for cutting the costs of beef production were:

1. Provide a year around feed supply with emphasis on silage, hay and temporary crop pastures, plus adequate supplements and minerals.

2. Secure more productive breeding stock with emphasis on simple but well-kept production records.

3. Reduce losses from parasites and diseases.

4. Reduce labor costs.

"Mechanization is expensive, but it is the only answer in this day." Dr. Miller said.

He suggested such aids as movable calf creeps, self-feeders and power mixers, besides modern feed-producing and harvesting equipment.

Outlook for Late '54 Egg Prices

On April 1, producers had 19 per cent more young chickens on farms than a year earlier. With this large increase, the outlook for late 1954 egg prices is not very favorable for producers, says Richard G. Ford, extension economist at the University of Nebraska. Egg prices now are about 33 per cent below a year ago in Nebraska.

FROM FAILURE TO SUCCESS

This is the story of a twenty year struggle by a hard working family. . .

Condensed from Southern Planter

M. H. McVickar

EVERY school boy in the country knows that it was at Appomattox, Virginia that the southern forces finally surrendered some ninety years ago. But in Campbell County, only a few miles away, a victory of a totally different kind has been accomplished in recent years. It has occurred on the C. L. Hutcherson farm.

So, when bankers wished to invite farmers and agricultural leaders of the area to a goodwill gathering, it was a natural for them to select this 322-acre farm as their meeting place. It symbolized what could be done by persistent, hard-working people in turning poor acres into productive ones, in transforming poverty-stricken lands into profitable ones, in pulling victory from defeat.

There's a real story here, the sort of tale which inspires other alert farmers to realize that they, too, can overcome their difficulties.

To begin that story, we have to go way back to 1919, when Mr. Hutcherson and his wife bought the farm for $17,600. It meant scraping together every penny they could, and after making the down payment, taking over a heavy mortgage.

You may have guessed what happened in the opening chapter—It was Defeat, and it wasn't long coming. The next spring, Hutcherson, with the help of his young sons and four tenant families, plowed up 30 acres and planted it with tobacco—the main crop. All worked like slaves, but when the crop was harvested and expenses were paid, there was nothing left to pay on the mortgage. Always

Reprinted by permission from Southern Planter, Richmond, Virginia

hoping that the next year would be better, more and more land went to tobacco, but the farm got poorer and poorer and the debts became larger and larger.

Everything seemed lost as the mortgage was foreclosed in 1932. However, the Hutcherson reputation for integrity and hard work saved the day. A more fortunate neighbor, who prefers to remain anonymous, decided that the Hutcherson boys, now fully grown, had "what it takes" and deserved another chance; that they were victims of an agricultural panic.

This kind-hearted neighbor went to Fred and told him that he would advance the money needed to bid in the farm. Trembling in his shoes, Fred made the high bid of $4,300. The boys were not even asked to sign a mortgage note, but to pay back the loan as best they could.

Thus, the sons took over the management of the farm with a new determination. They had noticed that the almost continuous cropping to tobacco had taken a heavy toll of top soil. They knew that something had to be done to save what little top soil was left. Having heard of strip cropping and how it saved soil, they started plowing the rougher fields in this fashion. The layout did not necessarily conform to the contour. Yields were a little better, but progress was still slow.

The turning point came when the sons asked John L. Harrison, local SCS conservationist, to come out and see if he could help them. Early one morning, Harrison, accompanied by County Agent Charles Ellis, showed up and walked over the farm.

Harrison and Ellis were in agreement that the farm had possibilities but that a complete job of conservation and soil building was needed. The boys were eager to cooperate but warned that any sizeable cash outlay was impossible. Working as a team, Harrison and Ellis developed a sound, pay-as-you-go land-use plan.

The whole cropping pattern was changed. Grain and sod crops were worked into the rotation. Harrison assumed responsibility for the conservation practices, and Ellis made varietal, fertilizer and cultural recommendations.

Neighbors began to notice that the fields on the Hutcherson farm looked greener, the buildings whiter, and the Hutchersons happier. The transformation continued, growing in momentum each year. The mortgage has long since been paid off, and the Hutcherson farm is pointed out, not as one of the poorest farms in Camp-

bell County—which it once was —but one of the best.

When asked how they turned a poor piece of land into a productive farm, they said, "The Soil Conservation Service technicians should be given all the credit in getting our farm operation working in an efficient manner."

Profit can be built, it has been shown, on the widespread Cecil soils of the South. No wonder the Blue Ridge Clearing Association, representing banks in the area, chose the Hutcherson farm for their tour. The progress is shown by comparing yields.

In the twenties, five farm families, a total of 13 workers, produced annually about 30 acres of tobacco, yielding 840 pounds per acre. The other crops were corn, 25 acres with a yield of 20 bushels per acre; small grain, 20 acres with an average yield of 15 bushels. The livestock consisted of 100 chickens and 3 cows.

Today, things are different. Three farm workers are producing 9.1 acres of tobacco yielding 2,285 pounds per acre, 35 acres of 75-bushel per acre corn, 40 acres of 50-bushel per acre small grain, and 50 acres of legume hay. The present livestock consists of 1,200 laying hens and 16 beef cows.

The contrast of what has happened is still more striking when one looks at the production per farm worker. Here are the figures. Production per worker in the twenties: Tobacco 1,940 pounds, corn 39 bushels, and small grain 300 bushels. Now for the average production per farm worker today: Tobacco 6,931 pounds, corn 875 bushels, small grain 667 bushels, 5,000 pounds of lespedeza seed, and 1,300 bales of hay!

As the years go by, more and more attention is being given to pastures. The 16-cow herd is just a start. All of the heifer calves are being saved, and the hope is for a 40-cow and calf-herd in a few years. As the livestock enterprise grows, more and more land is cleared and seeded to improved pasture. The trees are cut with a chain saw at ground level. Then, the seed bed is prepared with the aid of a bog disc and cultipacker. All seedings are combinations of permanent grasses and legumes.

Complete fertilizer is used in liberal amounts, both at seeding and as annual top-dressings. The sale of the pulpwood more than paid for the clearing and pasture establishment costs.

The combined use of good conservation practices, heavy fertilization, and good management has been responsible for the yield increases. For example, a cover crop is always seeded on the land used for tobacco. Two

hundred pounds of 2-12-12 fertilizer per acre is used as the cover is planted.

Then, at tobacco planting time, each acre gets 1,400 pounds of 3-9-6 tobacco grade fertilizer. In addition, any thin spots, and they are few, are also manured. Other crops are fertilized equally heavily.

Then, too, a carload of phosphate and potash, applied for the benefit of the seeding, is often spread following small grain harvest.

New Soil Test Developed

The new "baking soda" test for measuring plant-available phosphorus in soils which was developed cooperatively by the Colorado A and M Experiment Station and the U. S. Department of Agriculture is described in Circular 939 available for 15 cents each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Main advantage of the simple, new test is that it gives satisfactory results on a wide range of soils, including alkaline, neutral, and acid types. The inexpensive test employs a water solution of sodium bicarbonate (baking soda) to extract phosphorus from soil samples. It permits a good approximation of the amount of phosphorus a soil can provide to growing plants.

The scientists who developed the test emphasize that it is designed for soil-testing laboratories and not for farm use.

Colorado A & M College

Marketing Steers With Less Shrinkage

Steers loaded in late afternoon, shipped overnight and sold the next morning at market show the lowest shrinkage of all animals marketed over a seven year period by Texas' Beeville Experiment Station.

Steers which were loaded at 5 p.m. and market weighted at 8 a.m. the next morning had a pre-marketing shrink of only 3.83 percent. The animals were fed two hours prior to loading and were well filled.

In-transmit weight losses of 360 steers sold from 1947 to 1953 averaged 5.4 percent. Greatest shrink was noted when steers were moved in July directly to market from green grazing. Shrinkage was 9.39 percent.

Texas A & M College

66 SQUARE MILES OF PASTURES

The story of one man's achievement in turning abandoned land into productive pastures. . .

Condensed from Soil Conservation

Lester Fox

ONE day some years ago Harry Post had a vision of green pastures in place of the big areas of idle river bottom land he had seen in southern Louisana.

Post resigned from the Federal Housing Administration and borrowed $700 on his life insurance and $2,500 more from his father. Then he leased some of the idle land in St. Charles Parish.

Now, 13 years later, the vision has taken on shape and substance. Alone or in partnership with others, Post controls 66 square miles of once idle land in 5 parishes. He runs 2,300 head of cattle on the lush, year round pastures that he has made out of weedy and brush-burdened land.

"Even at today's low cattle prices, you can make an adequate profit from an operation like ours," Post says.

Post has fared well and so have his landlords, for their fields have been made productive once more.

Most of all, the land has benefited from the conservation treatment Post has given it. His program includes clearing the brush and thickets with a bulldozer, seeding grass and clover wherever necessary to get a stand established quickly for grazing, installing properly-engineered drainage systems, clipping pastures regularly to control weeds, and keeping the cattle herd small enough to prevent damage to pastures through overuse.

Abandonment of this good bottom land around 1930 shows how badly we needed to know about the conservation of our soil and water resources," Post says. "If we had put these conservation practices on the land a generation ago, agriculture in Louisiana would be a different story today."

Reprinted from Soil Conservation, Washington, D. C.

When it becomes necessary to graze more cattle on a given piece of land, Post says he will also add fertilizers to his conservation program.

"Right now," he explains, "when I have plenty of land I'd rather put that money into clearing, turtleback plowing and weed control. But where land is limited, fertilizing is necessary to get the greatest amount of high quality grazing."

Post gets multiple use from his pastures. In addition to year round grazing, he harvests crops of grass and cloverseed and cuts 50,000 bales of hay a year.

"With grazing the year-round, we use little hay ourselves," Post says. "We feed a little in the spring when the clover is most succulent, to prevent bloat. We never feed anything else. Most of the hay we sell."

Typical of Post's operations is a 150-acre pasture of Dallis and bermudagrass, and white Dutch and red clovers. Cattle graze the pasture all winter until March, when they are taken off to let a crop of cloverseed mature. The seed is combined in May, this harvest also producing half a ton of hay an acre. The cattle are then put back on the pasture until mid-June when they are taken off to let a hay crop develop. Hay is cut in August, and again in late October. Each cutting produces 2 tons or more per acre, so that altogether the pasture yields 4½ tons or more of hay per acre in addition to the grazing and seed crop.

Post gets year-round grazing this way: in the winter and spring, he has pastures of white Dutch and red clovers and fescue and rye grasses; in the summer and fall he has Dallis and bermudagrasses. Of course, there is overlapping of these plants.

With this top quality, year-round grazing, the cattle are always in excellent condition. Their calf crop averages a high percentage.

Post uses grade cows of various breeds and mixed breeds with registered Brahman bulls. "The Brahman bull produces a quick veal calf," Post explains. "I sell the calves in New Orleans, which is noted for its veal." Post markets them at 4 or 5 months, when they average 300 to 400 pounds.

Post also keeps a small herd of registered Brahman cows to produce replacement bulls.

Much of the land leased by Post was handicapped in the past by excess water. Some of it could not be used much of the time even for pasture. Post has solved this problem with modern drainage systems designed by Soil Conservation Service engineers. In a number of cases, for example, he has divided the field into plots about 100 feet wide, and "turtledbacked" each. That is, he plows each plot in such a way that it slopes gently to each side from a high point in the

center, resembling old-fashioned "crowned" highways. The water drains to the sides into V-shaped ditches. These ditches carry the water to lateral ditches which take it on to main ditches that remove it from the field altogether.

An operation the size of Post's requires a lot of labor and automotive equipment. Post and Jack Pizzolato of Hahnville, a partner in some of the operations, have 7 rotary mowers used exclusively for controlling weeds; 6 cycle mowers for cutting hay; 10 tractors; 2 combines for harvesting seed crops; 2 hay balers; 2 baled hay loaders; 2 hay trailer trucks; a cattle truck and trailer-truck; 3 pick-up trucks for general farm use; and a bulldozer for clearing brushland to establish pastures. In addition they have a wide assortment of plows, disks, harrows, drags, seeders and cultipackers. Their own repair shop maintains the equipment.

Post did not get into this business blindly. He had a background in agriculture and a thorough knowledge of land values. He was well aware of the work and risks involved.

Post studied agriculture at the University of California and at Southwestern, Lafayette, La. After being graduated from Southwestern in 1932, he taught school and did 4-H Club work at Rayne until 1935. He then went to New Orleans to work for the Louisiana Rural Rehabilitation Corporation. After 3½ years he became land appraiser for the farm section of the Federal Housing Administration for Louisiana, Alabama and Mississippi. This was the job he gave up to get into the pasture-cattle business.

"I began probing around and found out that the whole State was organized into soil conservation districts excepting the six southeastern parishes around New Orleans," Post recalls. "Then I got in touch with the Soil Conservation Service and Parish Agent A. J. Melancon to see if we couldn't set the wheels of progress in motion to get a soil conservation district organized for this part of the State."

After a lot of preliminary work by Melancon and Post, an election was held on June 4, 1949 and the landowners voted in favor of establishing the Crescent Soil Conservation District. There was not a dissenting vote.

Like all soil conservation districts, it is a sub-division of State government that is run by the farmers operating in the district. Post was elected one of the five supervisors. When the supervisors held their first organization meeting on June 28, 1949, they elected him chairman of the board, a position he has held ever since.

Does Your Dairy Herd Need More Culling?

It will pay you to consider some of the suggestions offered in this article on culling the dairy herd. . .

Condensed from Agricultural Situation

M. S. Parsons, AGRICULTURAL RESEARCH SERVICE

IS OLD "Bossy" worth her keep? With lower milk prices and continuing high costs, she may or may not pay her way.

The current upsurge in milk production which began in the late fall of 1952 has been due in part to more cows. And this increase in cow numbers in turn has been partly due to lower rates of culling of dairy animals. In 1952 and 1953, dairymen in the United States as a whole culled their herds at the rate of only 21 to 22 per cent as compared with an average rate of 25 percent for 1945-50. This lower rate of culling combined with a plentiful supply of dairy heifers, made possible the increase in cow numbers— reversing a downward trend which had been underway since 1945.

Since the fall of 1952 farmers have been producing more milk than consumers were willing to buy at prevailing prices. Yet production continues high and 1954 is likely to set a new record. Under these conditions it is logical to ask if dairy farmers might not be better off by culling their herds more heavily. Such an adjustment, if heavy enough, could reduce cow numbers and bring milk production closer in balance with market demand. And, aside from the price effects, it might also increase net incomes on some dairy farms by removing low-producing cows that are no longer profitable but which contribute to the surplus of dairy products.

Study Your Own Situation

Regardless of the overall merits of stepped-up culling, each dairy farmer before coming to a decision, needs to consider how **heavier-than-normal** culling would affect him in his own situation. The decision generally centers around certain individ-

Reprinted from Agricultural Situation, Washington, D. C.

ual cows that are producing milk at relatively low rates. There are at least three questions to think about:

1. Will it pay to remove cow x in favor of a higher-producing cow?

2. Will it pay to remove cow x from the herd without replacing her?

3. Assuming cow x is to be removed, which time is preferable?

The answer to question 1 is fairly easy. A large mass of evidence indicates that the replacement of a cow by a higher-producing cow will generally be profitable. More milk production will also result in that particular herd, and in the Nation as a whole if enough dairymen do the same. But in the short-run it is obviously impossible for all dairymen to do this.

The answer to question 2 is more involved and requires an analysis of probable receipts and expenses if the cow is to be removed from the herd rather than being kept for a certain period. Suppose for example that a specialized dairy farmer is considering culling a cow which on the basis of past records is likely to produce 6,000 pounds of 4.0 percent milk during the year. This is about average production for many of the dairy States and at prices fairly typical of recent years, the cow's output would be worth around $270. If he disposes of the cow, his gross income would be reduced by this amount. On the other hand, some of the production expenses would be reduced or eliminated, but not all of them.

Under most conditions, and using recent prices, the reduction in expenses would be about as follows:

Grain (1.0 ton)	$80
Hay (2.5 tons)	63
Milk Hauling	12
Depreciation on Cow	15
Dairy Supplies & Services	15
Miscellaneous	15
Total Reduction	200

This assumes that hay and home-grown grain can be sold at going prices, but that silage and pasture cannot. No reduction in labor cost is allowed on the reasonable assumption that on a specialized dairy farm the labor freed in handling one cow is not likely to find other productive employment, at least in the short run. (This of course, might not be the case on a diversified dairy farm.) Thus the result is a reduction in gross income of $270, a reduction in expenses of about $200, and a reduction in net income of aroud $70. In other words, the farmer would be somewhat better off financially by keeping the cow even though she is not a high producer. The advantage of keeping the cow would be lowered, of course if the farmer

had less favorable market for milk and received a lower price.

But suppose a cow in question is capable of producing only 4,000 pounds of milk during the year. Gross income from this cow would be about $180. Expenses would be somewhat less than for the 6,000-pound cow but not in proportion since the maintenance cost would be nearly the same. If this cow were removed from the herd, a total of perhaps $170-$180 in out-of-pocket expenses would be eliminated. To remove this low-capacity cow would leave the farmer with practically no change in net income as compared to $70 loss in the case of the 6,000-pound cow. This illustrates the fact that a point will be reached as we go down the production scale when a cow does not repay out-of-pocket expenses, and should be removed from the herd even with no replacement in sight.

The exact location of this culling point will depend in part on the feed supply, labor force, barn room and other particular circumstances of the individual farm.

For example, the farm that provides adequate pasture for a period of 5 to 6 months presents quite a different situation than does the more typical farm with only 2 to 3 months of good pasture.

Furthermore, the location of the culling point depends on price relationships. When milk is low in price relative to costs, as it is now, it does not pay to keep all cows that would have been profitable under more favorable prices. Cows that were just above the margin in 1953 are likely to be below it in 1954. The best way to find such cows is by the type of analysis indicated above, **as applied to the individual farm situation.** This is not difficult and can be done by any farmer who keeps records on milk production and feed used for individual cows in his herd or who can make estimates of these items.

Assuming the decision has been made to cull a certain cow, the question still remains of **when is the best time to do so.**

This is a question that the individual farmers will have to answer for himself based on the extent of pasture feed and other conditions.

Milk prices are seasonally low during the pasture period but, on the other hand, most farms have pasture feed that has no alternative use. If adequate pastures are available, milk production can be maintained at low cost with a low rate of grain feeding and with little hay. Also pertinent is the fact that prices for cull cows are generally lower by some 15 percent in the fall than in the spring.

"RUMEN INDUSTRIES, INC."

New discoveries now add to our knowledge of dairy science. . .

Condensed from Guernsey Breeder's Journal

Dr. M. F. Gribbins

ONE of the oldest and largest of this country's chemical industries is engaged in the fermentation business. "Rumen Industries" practiced decentralization long before the threat of the atom bomb, and has constantly followed a pattern of having many small installations. There are approximately 125,000,000 of these factories in the United States today. These are not large fermentation plants by the standards which are normally used in comparing manufacturing operations. The plants have an average daily capacity of about 20 gallons; they are mobile and self-propelled. We see them as cattle, sheep, and goats —the ruminant animals.

While the term "ruminant" applies to all cud-chewing animals—including buffalo, deer, giraffes, camels and others—the remainder of this discussion deals only with the cow which may be considered as typical for all ruminants. The No. 1 stomach is the rumen—commonly known as the paunch—and is the largest of the four stomachs of the cow.

Actually, the digestive process performed in this rumen is not accomplished by the cow herself but by billions of bacteria, yeasts, and other micro-organisms. Strictly speaking, these bacteria are tiny plants, and their attack on the food supplied to them by the cow produces a breakdown of materials which is directly comparable to the action in a fermentation vat.

As fermentation is accomplished, feedstuffs are broken down into materials which the micro-organisms can assimilate, as well as into other materials which are digestible by the cow herself. After the micro-organisms have grown and completed their life cycle as a result of this

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process, they are passed along to the cow's other stomachs where they are, in turn, digested. We might say that there is a very rapid turnover in personnel among the numerous active employees of "Rumen Industries."

In effect, then, we see that the rumen might be thought of as a workshop in which billions of microscopic plants are able to break down the cellulose in the roughages eaten by the cow. In addition to furnishing food for the micro-organisms, this process provides organic acids (and perhaps simple sugars) which the cow is able to digest. At the same time the micro- organisms themselves serve as a source of protein.

The many plants of "Rumen Industries, Inc.," through their unique fermentation process, serve to convert otherwise indigestible roughage into usable materials. These materials, in turn, are converted into growth and into meat, milk, and hides—essential end products for human consumption or use.

While the existence of the rumen has been known for centuries, it is only in recent years that its full significance has been understood. As a result of these recent discoveries, animal nutritionists have been seeking ways to increase the effectiveness of the rumen as a source of simple carbohydrates and proteins, vitamins, and the many other chemical compounds which its inhabitants supply to the cow.

One important discovery was the fact that an increased supply of nitrogen made it possible for the microscopic plants in the rumen to make more effective use of the roughage supplied to them by the cow. Experiments conducted with synthetic urea in the form of "Two-Sixty-Two" feed compound, which contains 42 per cent nitrogen, disclosed that this product helped to stimulate rapid bacteria growth in the rumen, which, in turn, brought about more efficient cellulose breakdown. This means that cattle can now eat and digest roughages previously considered of little value.

The nitrogen from this feed compound can be utilized by the bacteria in the rumen only when fed along with grain or roughages which supply the carbohydrates or energy used in the conversion of urea nitrogen to protein. "Two-Sixty-Two" can be used to supply as much as one-third of the nitrogen requirements of the cow. So that this product will be used in its safest and most effective concentrations, it can be purchased only ready-mixed in feeds from reputable feed manufacturers who have the proper equipment and know-how to assure thorough blending.

Urea nitrogen has helped to provide a way in which low quality roughage can be made more

productive. Further, it has provided a means of making a greater amount of the other protein sources available to non-ruminant animals where urea nitrogen cannot be used.

For the past several years, experimentation has been going forward in all parts of the country to discover the best means of using "Two-Sixty-Two" to supplement such varied roughage materials as cotton seed hulls, palmetto leaves, needle grass, and desert shrubs in the southern part of the country; and in other areas, corncobs and stalks, wheat straw, and timothy hay.

While the nutrient composition of all of these may vary from one area to the next, "Two-Sixty-Two" used to increase their value has a uniform purity and concentration year in and year out. This fact offers definite advantages to the feed manufacturer in formulating high quality feeds which will serve the needs of the community in which he operates. Furthermore, the high concentration of urea nitrogen in this feed compound allows flexibility in formulating feeds by providing "room" for additional minerals, readily available carbohydrates, and vitamins.

Like many a modern chemical plant, the production lines of "Rumen Industries, Inc." are being checked for maximum efficiency in operation. The use of urea nitrogen provides a new raw material which contributes to more efficient—and more economical — production for the local installations with which cattle feeders and dairymen are so familar.

Lice and Tick Control On Dairy Animals . . .

Lice and ticks on dairy cows can cause a sharp drop in milk production, but such losses are easily averted if proper insect control measures are carried out.

F. M. Fuller, Jr., Texas entomologist, recommends for the control of lice five-tenths per cent methoxychlor or three-hundredths per cent lindane. One spraying with methoxychlor usually gives adequate lice control but two treatments of lindane at two week intervals are often needed, Fuller explains.

One per cent rotenone or one-tenth per cent pyrethrin gives effective control of ticks. Repeated and thorough applications, he adds, reduce tick populations most effectively.

Fuller explains that methoxychlor does not control ticks and lindane doesn't have long enough residual action to give good results.

Texas A.&M. College

UNIDENTIFIED GROWTH FACTORS OF TURKEYS

For maximum growth, your feed should include the ingredients which carry these factors. . .

Condensed from Turkey World

Dr. J. Russell Couch, TEXAS A AND M COLLEGE

UNIDENTIFIED growth factors for turkey poults have been reported in dried whey, distillers dried solubles, fish meal, fish solubles, dried brewers yeast, liver preparations, and in grass and alfalfa juices.

Fish meal and fish solubles were reported to increase the growth rate of turkey poults when added to a feed formula that was complete with regard to known nutrients. The diets used by some of the earlier workers were supplemented with vitamin B-12, but not with antibiotics. Growth of turkey poults can be increased from 10 to 15 percent when fish meal or fish solubles are added to a diet supplemented with vitamin B-12 and an antibiotic, or combination of antibiotics.

Studies at Texas agricultural experiment station during the past three years have shown that distillers dried solubles possess a distinct growth-promoting activity for the turkey poult. This product, when used at a level of three to five percent, increases the growth rate of turkey poults from five to 20 percent.

It is believed from the work carried out by R. L. Atkinson and the writer that distillers dried solubles contain a separate and distinct unidentified growth factor for the turkey poult which may be different from the other factors.

From three to five percent dried brewers yeast has been used in these studies. Doctor Scott of Cornell has also presented data which show that dried brewers yeast contains a factor necessary for the prevention of enlarged hocks in turkeys.

Reprinted by permission from Turkey World, Mt. Morris, Illinois

The enlarged hock disease is quite a problem in some sections of the country. The condition is no doubt related to the calcium, phosphorus, and manganese sulfate content of the feed. Doctor Scott has shown that it can be partially prevented by increasing the niacin supplementation to the feed. He has recommended that a level of 40 grams of niacin per ton be used in turkey feeds.

Choline chloride may also be a factor in enlarged hock disease. Eight hundred grams of choline chloride per ton have been added to the experimental rations used by Atkinson and the writer. Enlarged hock disease has not been observed to any appreciable extent in tests in the poultry department of the Texas A & M College System. It should be emphasized, however, that dried brewers yeast does prevent the enlarged hock disease and very definitely does stimulate the growth of turkeys when added to a feed complete with regard to known nutrients and containing vitamin B-12 and an antibiotic.

Dried whey has been reported to increase the growth rate of turkey poults. The growth response which has been obtained by adding dried whey to turkey feeds has ranged from 10 to 15 percent. A supplementary relationship apparently does exist between dried whey and fish solubles. This would indicate that each of these products contains a separate and distinct unidentified growth factor.

It is believed by some research workers that dried brewers yeast contains the same factor that is found in whey. It may also contain the fish factor. Growth of turkey poults has been increased by adding five percent yeast and three percent fish solubles over and above that obtained by feeding either of these products singly.

Other reports would lead to the conclusion that dried brewers yeast contained a separate and distinct growth factor from the one found in fish or the one found in whey.

Results from a recent experiment conducted at Texas A & M College show that as much as five percent cane molasses can be used as a carbohydrate source in turkey starter feeds. The addition of molasses to the feed improved the appearance and would appear to make the feed more palatable to the birds. No increase in growth or improvement in feed efficiency was obtained by the addition of the molasses. Attention is directed to this fact since molasses at times during the past twelve months has been quite cheap. The product is a readily available source of carbohydrates and can be used up to the level of five percent. Feed manufacturers are more prone to use 2½ per-

cent cane molasses in poultry feeds.

It was mentioned above that grass and alfalfa factors have been shown to have growth promoting activity. According to the research reports of Dr. M. L. Scott of Cornell University, dehydrated alfalfa leaf meal is a standard ingredient in poultry feeds. From four to five percent of this product should be added to turkey starter and grower feeds. Dehydrated alfalfa leaf meal provides carotene or provitamin A which will take care of a part of the vitamin A needs of the growing poults. It will also serve as a source of the unidentified alfalfa factor.

The turkey grower should examine the feed tag and determine whether the feed contains sources of the unidentified growth factors. From the practical application of the research results to date, it might be stated that the feed manufacturers should include 2½ to three percent dried whey, 2½ to three percent distillers dried solubles, three to four percent fish meal, 2½ to three percent fish solubles, and two to three percent dried brewers yeast where it is possible to obtain these ingredients. It is probably not necessary to have all of these sources of unidentified growth factors in the same turkey feeds.

The picture at the present time is not clear whereby the growth factors for the turkey can be differentiated quite as clearly as has been true for the chick. It was mentioned above that the product, distillers dried solubles, apparently contains a specific growth-promoting activity for the turkey poult since samples of distillers solubles will promote growth of the poult to a greater extent than the same sample will promote the growth of the chick.

Distillers dried solubles are not always obtainable. It is believed wise to use more than one source of the factor where this is possible.

The supply of dried brewers yeast has at times been somewhat inadequate in meeting the demand for this product for use in poultry feeds. If the supply of dried brewers yeast is limited, it should be used in turkey feeds first, because it possesses a special property which is required for the prevention of enlarged hocks in turkeys where this syndrome happens to be a problem.

Dried whey is available and should be used. It is not necessary to add more than three percent of this product to turkey feeds in order to obtain the growth stimulation desired.

Fish meal is available in most localities and should be used in turkey feeds at the levels of three to four percent. Fish meal is a feed ingredient which may be used to supply protein in the total ration. If the cost of the

fish meal is such that it can be used on a unit protein basis, much higher levels can be used than were indicated above.

* * *

The average American eats 94 pounds of potatoes each year.

* * *

It is rather difficult to write a specification for the use of fish meal in feeds due to the fact that the product is more available on the East and West Coast, and the fact that the freight on fish meal may become a factor in determining the economics of usage in feeds.

Fish solubles is an excellent source of an unidentified growth factor for turkey poults. All feed manufacturers are not equipped to use the liquid condensed fish solubles and may desire to purchase a product which has already been dried. Preliminary studies show that it is quite stable to heat. It is not believed that drying fish solubles affect the unidentified growth factor properties of fish solubles to an appreciable extent.

In summary, it might be stated that the turkey starter ration should contain 28 percent protein; an adequate supply of calcium, phosphorus, and manganese; should be fortified with B vitamins; and have an antibiotic or combination of antibiotics added; and finally, the turkey feeds must contain sources of the unidentified growth factors if maximum growth is to be attained.

Silage As Hog Feed

Silage, particularly grass silage, has come in for its investigation for swine feeding, especially in brood sow rations. Results indicate that up to 10 pounds of grass silage may be safely fed per head daily to bred gilts and larger amounts to older sows.

Silage will reduce the ration cost as it may show a feeding value of 60 percent of that of a concentrate mixture. However, a grain mixture is not to be excluded from the sow ration when silage is fed.

Roughage feeding to swine is attracting more attention in recent months. Some folks prefer slow feeding of their pigs and include such feeds as alfalfa meal, oats, and similar feeds in rations for growing and fattening pigs.

Slower gains with lower cost feeds may reduce production cost. Also leaner carcasses can be produced on less fattening feeds. Roughage feeds have long been favored in the brood sow rations, especially for self-feeding.

Better Farming Methods

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Coming Through Drought—Oct. 1953
To Make Beef—Oct. 1953
Improved Purdue Supplement—Oct. 1953
Feeder Calves—Nov. 1953
Dwarfism—Nov. 1953
New Beef Breeds—Dec. 1953
500 Beef Club—Dec. 1953
Baby Beef Program—Jan. 1954
Weigh Sires and Calves—Jan. 1954
Beef Outlook for '54—Feb. 1954
Truth About Dual-Purpose Cattle—Feb. 1954
Beef Costs Down 20%—March 1954
Efficiency in Beef Production—March 1954
Production Testing Beef Cattle April 1954
Self-Service for Steers—May 1954
Hurry-Up Hormone—June 1954
A Good Herdsman—June 1954

CONSERVATION

Old Stuff in Old World—Nov. 1953
Christmas Trees for Eroded Land—Nov. 1953
Judging Land—Oct.-Dec. 1953
Conservation for More Farms—Dec. 1953
Remade Farm—Dec. 1953
Your Farm Pond—Jan. 1954
Conservation Farmer—Jan. 1954
Brush Patch to Seeded Field—Jan. 1954
Grass Waterways—Feb. 1954
Water Storage is Good Business—Mar. 1954
Improvements Unlimited—May 1954
Washington County—June 1954
Poverty Ridge—June 1954
Built Back His Farm—June 1954

CROPS

Water Abundant—Oct. 1953
Stop Wheat Rust?—Nov. 1953
Control Corn Rootworms—Jan. 1954
Thicker Stands, More Corn—Feb. 1954
200 Bushels Per Acre Corn—March 1954
Weed Control in Corn—April 1954
Control of Corn Insects—April 1954
Band Seeding Legumes—May 1954
Hybrid Seed, No Detasseling—May 1954

DAIRY CATTLE

125 Bu. Wheat Per Acre—Oct. 1953
Trefoil is Different—Oct. 1953
Grow Legume Seed—Oct. 1953
Build 600 lb. Herd—Oct. 1953
Mastitis—Oct. 1953
Milk Parlor—Oct. 1953
Roughage and Milk—Oct. 1953
New Scours Drug—Nov. 1953
$100 More A Cow—Nov. 1953
Artificial Breeding—Nov. 1953
20,000 lbs. of Milk Per Man—Nov. 1953
Calf Factory—Dec. 1953
Dairy Muddle—Dec. 1953
Marks of Good Milker—Dec. 1953
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Raise the Calf—Jan. 1954
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Heavier Calves, No Scours—Feb. 1954
Milk 3 Times A Day—Feb. 1954
New Approach to Mastitis—Feb. 1954
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Herd Management and Fat Yield—March 1954
Simplify Milk Inspection—April 1954
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Dairy Price Supports—May 1954
Test Tube Magic—June 1954

FARM BUILDINGS

Self-Feeding Silo—March 1954
Larger Cow Stalls—April 1954
New Cow Barn—May 1954
Dry Lumber on the Farm—May 1954

FARM MANAGEMENT

Agricultural Outlook 1960—Oct. 1953
Farm Land Prices—Nov. 1953
Farm Problems in 50's—Nov. 1953
Check Farm Fire Insurance—Nov. 1953
Safety is No Accident—Nov. 1953
Rural Fire Protection—Dec. 1953
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FARM EQUIPMENT and MACHINERY

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How To Repair Tractors—Jan. 1954
How Not to Drive a Tractor—March 1954
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Power Feeding—June 1954

FEEDS

Open Stack Grass Silage—Oct. 1953
Cook Feed for Finish—Nov. 1953
Feed More Forage—Nov. 1953
New Way Grass Silage—Nov. 1953
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Feeding Molasses to Dairy Cattle—Feb. 1954
Real Value of a Dairy Feed—Feb. 1954
Drying Hay at Hominy Hill—March 1954
Grass Silage Cuts Costs—March 1954
Supplements Help Roughage—April 1954
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FERTILIZERS

Manure, Valuable—Oct. 1953
Big Yields—Nov. 1953
Spreading Fertilizer by Air—Dec. 1953
New Fertilizer Needs Test—Jan. 1954
Doubled Pasture Capacity—Feb. 1954
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Handling Liquid Manure—May 1954
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Leaf Feeding—June 1954

FORESTRY

Market Farm Timber—Oct. 1953
Father-Son Forestry—Nov. 1953
Bigger Sugar Trees—Dec. 1953
Plant Pines—May 1954

FRUIT

Pick-Your-Own Harvesting—Dec. 1953
Tomorrow's Fruit Varieties—Jan. 1954
Don't Miss Roadside Profits—Feb. 1954
Field Brome in Orchards—April 1954
Fork Lift Orchard Truck—May 1954

HAY AND HAY CROPS

Yellowed Alfalfa?—April 1954
Hay Drying—May 1954
Big Change, Haymaking—May 1954
Beat the Weather—June 1954
Grasslands, Fertilizer Use—June 1954

HOGS

1000 Hogs on 100 Acres—Oct. 1953
Finish on Swine—Oct. 1953
Soybean Oil Meal—Nov. 1953
$300 Acre from Pork—Dec. 1953
Ten Good Hogs Per Sow—Dec. 1953
Modern Hog Feeds—Jan. 1954
Report on Hybrid Hogs—Feb. 1954
Keep Swine Thrifty—Feb. 1954
Weigh Pig Litters—March 1954
201 lb. Hogs in 4 Months—March 1954
15 Recommendations for Hogs—Mar. 1954
Feeding Antibiotics—April 1954
Double Bonus Meat Hogs—April 1954
Pigs On Sows too Long?—May 1954
Feeding Your Pigs—June 1954
Age to Wean Pigs—June 1954
$1,000 A Month from Pigs—June 1954

IRRIGATION

Irrigation Makes Grass—April 1954
More Than Crop Insurance—May 1954
Irrigation, Income Insurance—June 1954

INSECTS and INSECTICIDES

Disease Kills Japanese Beetle—Jan. 1954
Lick Alfalfa Pests—March 1954
Powder Post Beetle—March 1954
Control Hay Insects—April 1954
Control Mormon Crickets—April 1954
Vegetable Insects—May 1954

PASTURES

$1000 An Acre Pastures?—Nov. 1953
Keeping Up With Grass—Nov. 1953
Kentucky 31 Fescue—Nov. 1953
Succeed with Hay and Pasture—Dec. 1953
Grass, Your Best Crop—Feb. 1954
All-Grass Rotation—March 1954
Hauled-In Pasture—April 1954
Daily Rationed Grass—May 1954

POULTRY

One Man, 17,000 Broilers—Oct. 1953
Compare Poultry Costs—Nov. 1953
All-Mash for Layers—Dec. 1953
Premium Prices for Eggs—Dec. 1953
Gander at Goose—Dec. 1953
Latest on Broiler Feeding—Jan. 1954
Turkey Pinfeathers—Feb. 1954
Methionine for Broilers—March 1954
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Better Job with Poultry—April 1954
Poultry Pasture—May 1954
Fryers Find Ready Sale—May 1954
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Production Testing Broilers—June 1954

SHEEP and GOATS

Sheep of Future—Oct. 1953
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Ewe Testing—May 1954
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SILAGE

Preserve Grass with Bisulfite—April 1954
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Ready for Dry Weather—Dec. 1953
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Signs of Good Health—Jan. 1954
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WEEDS

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MISCELLANEOUS

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Acres Unlimited—Jan. 1954
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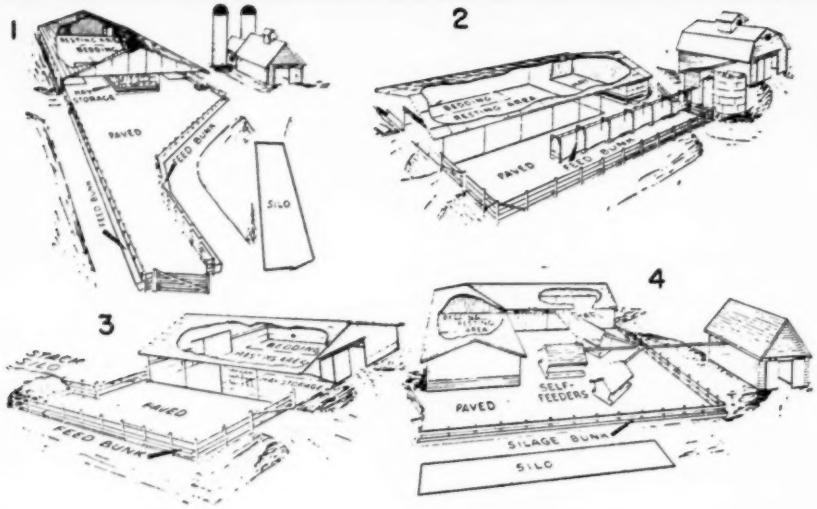

FASTER, EASIER feeding is built into the feedlot plans sketched above. They were planned for: (1) Wagon distribution of silage and grain for 200 cattle. (2) Carrier distribution of concentrates and silage for 50 to 75 cattle. (3) Self-feeding silage for 35 to 40 cattle. (4) Self-feeding grain for 125 cattle.

Easy does it in the FEEDLOT

Time is money, and many farmers fattening beef cattle are losing a lot of time doing feedlot chores. In Illinois, for example, farmers average 10 to 12 man-hours feeding and caring for each animal they send to market. Most of the work is done by hand.

When researchers set out to find labor-saving ways to feed beef animals, they found that taking the backache out of feedlot chores can also increase efficiency. On some farms this may be a matter of a few changes in using equipment already on hand. On other farms, it may be a major operation—rearranging buildings, remodeling or adding to storage and handling facilities, buying some power equipment.

Here are general suggestions: (1) Build one story barns and sheds open to the South or East. (2) Store hay on ground level. (3) Place grain and supplement feeding devices outside. Use fence bunks for wagon or power scoop feeding. (4) Provide 30 to 35 square feet of barn space for each animal not including storage and about the same outside in the feed lot. (5) Pave the feed lot. *Agricultural Research*